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**REMEDIAL ACTION WORK PLAN
FOR WAL PIPELINE REMOVAL
AT 3000 HORIZON DRIVE
UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PA**

Prepared For:

United States Environmental Protection Agency

and

Pennsylvania Department of Environmental Protection

Prepared By:

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On behalf of:

**Liberty Property Limited Partnership
and**

Liberty Property Trust
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June 23, 2005
4013-05000



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Environmental & Remediation, Inc.

June 23, 2005
HA4013-04000

VIA OVERNIGHT EXPRESS MAIL

Mr. Joseph McDowell (3HS21)
Remedial Project Manager
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103

Subject: Remedial Action Work Plan for WAL Pipeline Removal at 3000 Horizon Drive
Upper Merion Township, Montgomery County, PA

Dear Mr. McDowell:

Enclosed with this letter are three copies of the subject work plan ("Work Plan"). This Work Plan is being submitted in accordance with the Pipeline Removal Consent Order currently being negotiated for the site, and provides a discussion of the procedures and methodologies to be followed during the removal of the portion of the pipeline located on Liberty's 3000 Horizon Drive property.

Should you have any questions regarding this Work Plan or any other project related issues, or if you require anything additional, please do not hesitate to call me.

Sincerely,
PENN ENVIRONMENTAL & REMEDIATION, INC.

Michael A. Christie, P.G.
Vice President

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1.0 INTRODUCTION

Liberty Property Limited Partnership and Liberty Property Trust (collectively "Liberty or LPT") own the property located at 3000 Horizon Drive in the Renaissance Park in Upper Merion Township, Montgomery County, PA (the "Property"). The Property is occupied by one building and associated asphalt covered parking lots. The location of the Site is shown on Figure 1 and the layout of the Site is included on Figure 2.

A Waste Ammonia Liquor (WAL) pipeline historically connected the Alar Wood Steel plant, located to the east of the Property, to Quarries 1, 2, and 3 at the Crater Resources Superfund Site, located to the south and west of the Property. The exact location and alignment of the pipeline between Horizon Drive and Flint Hill Road was not previously known, although a review of historical information suggested that the pipeline ran parallel to the southern boundary of the Property.

The Record of Decision (ROD) for the Crater Resources Superfund Site requires that the entire route of the former WAL pipeline be fully investigated and characterized where there have not been previous investigations to determine if remnants of the pipeline exist and if soils along the route of the pipeline have been impacted. This work has been designated as OU-5 and encompasses the section of the former pipeline between Flint Hill Road and Horizon Drive. The Crater Resources Cooperating Respondent Group ("Group") developed a Work Plan to investigate OU-5 entitled "Remedial Design Work Plan for WAL Pipeline (OU-5), dated October 26, 2004 (the "OU-5 Work Plan"), which was approved for implementation by the USEPA.

However, prior to the Group initiating this work LPT decided to implement the investigation set forth in the aforementioned OU-5 Work Plan at the Property, investigating that area within the southern portion of the Property located along the Property boundary and adjacent to the projected run of the pipeline. LPT's consultant, Penn Environmental & Remediation, Inc. (Penn E&R) prepared a work plan for the investigation, which followed the requirements and procedures of the OU-5 Work Plan, entitled "Remedial Design Work Plan for Investigation of Former WAL Pipeline (OU-5) at the 3000 Horizon Drive Property," dated March 7, 2005. This work plan was approved by USEPA in a letter dated March 1, 2005.

As discussed in detail in Section 2.0 below, Task 1 (Field Locating the Former Pipeline) and Task 2 (EM Survey) of the March 7, 2005 work plan were implemented by Penn E&R. Based on the results of this work, portions of the WAL pipeline were confirmed to be located along the southern portion of the Property. The approximate location of the portion of the pipeline located on the Property is shown on Figure 3. In response to these results, LPT has elected to remove the portion of the pipeline located at the Property. This Remedial Action Work Plan (RAWP) outlines the activities that will be implemented by LPT as part of the removal of the pipeline. LPT's proposed remedy of excavation and off-site disposal of the portion of the WAL pipeline located on the Property will meet the Remedial Action Objectives and Performance Standards of Section VIII and XII, respectively, of the ROD, and will satisfy the Statutory Determinations of Section XIII of the ROD.

2.0 PREVIOUS SITE ACTIVITIES

As indicated above, LPT undertook an investigation to determine if the WAL pipeline was located on the Property. LPT's consultant, Penn E&R prepared a work plan for the investigation entitled "Remedial Design Work Plan for Investigation of Former WAL Pipeline (OU-5) at the 3000 Horizon Drive Property," dated March 7, 2005. This work plan, which was approved by USEPA in a letter dated March 1, 2005, included implementation of the following five tasks:

- Task 1 - Field Locating the Former Pipeline Alignment
- Task 2 - EM Survey
- Task 3 - Test Pit Excavations
- Task 4 - Geoprobe Sampling
- Task 5 - Surface Soil Sampling in the Swale

As discussed in more detail below, Penn E&R implemented the work associated with Tasks 1 and 2 and a portion of the pipeline was determined to be located on the Property. Based on the results of this work, LPT has decided to remove the pipeline from the Property. Tasks 3 through 5 in the March 7, 2005 work plan were not implemented as some of this work will not be necessary since the pipeline was identified and is being removed and some of the work is being incorporated into this Work Plan. The results of the Task 1 and Task 2 activities are discussed below.

Task 1 - Field Locating the Former Pipeline Alignment

As indicated in the OU-5 Work Plan, the Group reviewed aerial photographs from 1965, 1970, 1975, 1980, 1985, 1990, 1995, and 2000 and compared these photographs to a 1948 aerial photograph provided to them by the USEPA. The Group also reviewed development plans for the Triad Building (2200 Renaissance Boulevard) and the Renaissance Regional Stormwater Basin, which is located directly east of the Property. Based on this review, the Group identified the approximate location and alignment of the pipeline, which appears to have followed along a cleared path/access road which is clearly visible on a number of the historical aerial photographs and on the site development plans. As a result of these review efforts, the Group traced onto the 2000 aerial photograph the former pipeline alignment with respect to existing features. Based on this tracing, the Group indicated that they believed the alignment of the former pipeline could be field located within an accuracy of about 15 to 20 feet of its actual former location.

With the exception of the 1948 photograph, Penn E&R reviewed the aforementioned aerial photographs as part of the development of the March 7, 2005 work plan. Penn E&R also reviewed the 2000 aerial photograph on which the Group traced the alignment of the former pipeline. Based on these review efforts, LPT generally agrees with the Group's alignment of the pipeline as shown on the 2000 aerial photograph and their belief that it could be field located within an accuracy of about 15 to 20 feet. The 2000 aerial photograph on which the Group traced the pipeline alignment showed that it may have run along or near the southern Property boundary. Based on this interpretation of the pipeline alignment, LPT's initial investigative efforts focused on the area adjacent to the southern Property boundary between a point located directly south of the eastern corner of LPT's adjacent 3200 Horizon Drive property and at a point

at the eastern most Property corner. The layout of the Property and the area of investigation are shown on Figure 2.

From February 1 through February 3, and on March 7, 2005, Penn E&R conducted clearing activities at the Property in the area of investigation to attempt to locate any evidence of the former WAL pipeline and to clear the area to be included in the EM survey. As required, 4-foot wide by approximately 50-foot long transects were cleared at approximately 20 foot intervals through the brush along the length of the area of investigation and to be subsequently encompassed by the EM survey. After clearing was completed, the area was visually inspected for evidence of the pipeline. No evidence of the pipeline was identified during the clearing activities.

Task 2 - EM Survey

An electromagnetic (EM) survey was performed over the area of investigation shown on Figure 2 which, as indicated above, incorporated the area where the former WAL pipeline was suspected to have been located on the Property. The EM survey was completed by Enviroscan, Inc. (Enviroscan) of Lancaster, Pennsylvania on March 8, 2005. A detailed report of the activities implemented and the results of the survey, as prepared by Enviroscan, is included in Appendix A. EM-31 survey equipment and a magnetometer were used during the survey in all areas previously cleared by Penn E&R. The EM survey was performed perpendicular to the potential pipeline alignment at 20-foot intervals along an approximate 30-foot to 70-foot wide corridor extending north of the southern Property boundary. The area included in the survey is shown on Figure 2 and on Figure 1 included in the Enviroscan report in Appendix A.

The Enviroscan report shows the detection of a linear anomaly that runs east to west just north of the southern Property boundary. Enviroscan interpreted this anomaly to be associated with a linear metallic object similar to a pipeline. The location of this linear anomaly is shown on Figures 2 and 3 included in the Enviroscan report in Appendix A and on Figure 3. The location of this anomaly was marked in the field with pin flags. The signal associated with the west central portion of the anomaly (as shown by dashed lines on Figures 2 and 3 in the Enviroscan report in Appendix A and on Figure 3) was weaker than the signal associated with the eastern and western ends of the anomaly. This weaker signal may represent areas where the pipeline is possibly missing.

As shown on Figure 3 and as indicated above, the pipeline runs east to west just north of the southern Property boundary. The pipeline curves to the south in a westerly direction and ultimately leaves the Property about 640 feet from the eastern Property boundary, where it appears to travel onto/under the Williamsburg Commons property. The curve in the alignment of the pipeline to the south was expected and can be seen clearly on historical aerial photographs. The pipeline/anomaly stops abruptly about 125 feet from the eastern property line. However, based on available information, the pipeline was known to have continued to run east off of the Property towards Flint Hill Road. The fact that it was not identified at the eastern end of the Property during the EM survey suggests that this portion of the pipeline may have been removed sometime in the past.

As indicated above, the alignment of the pipeline as determined during the EM survey and shown on Figure 3 was marked in the field with pin flags. Also, the alignment of the pipeline was surveyed using a hand-held GPS unit. After flagging the alignment, the route of the pipeline was walked and visually inspected. During the inspection, the top of a 4-inch diameter steel pipe was observed near the eastern end of the anomaly/pipeline detected during the EM survey and shown on Figure 3. The top of the pipe was just barely above the ground surface and the visible section was only about 30-feet in length. Also, a piece of 4-inch diameter pipe discarded on the ground was observed in this area. The piece of discarded pipe looked similar to the pipe that was partially visible and still in tact in the ground. The presence of this piece of discarded pipe and the location of the pipeline so close to the ground surface in this portion of the Property supports the conclusion above that a portion of the pipeline at the eastern end of the Property may have been removed sometime in the past. As discussed in Section 3.0, the area between the terminus of the pipeline, as shown on Figure 3 and the eastern property boundary will be investigated with test pits to ensure that the pipeline is no longer present in this portion of the Property.

Also, Penn E&R dug a small hole near the western end of the pipeline, just before the pipeline leaves the property. A 4-inch diameter steel pipe was encountered in the hole about 1 to 1.5 feet below the ground surface. The pipe at this location appeared similar to the pipe observed on the ground surface near the eastern limit of the pipeline.

3.0 REMEDIAL ACTION AND IMPLEMENTATION

The proposed remedy for the portion of the former WAL pipeline present on the Property is to excavate and remove the pipeline and any associated impacted soils and collect appropriate post-excavation soil samples to confirm the effectiveness of the remedial activities. Upon receipt of the results of the post-excavation soil samples, a focused risk assessment will be completed, if necessary, to ensure that no unacceptable risks exist at the Property. This section of the RAWP discusses the activities that will be followed during the removal of the pipeline.

3.1 Site Preparation

Permits

Penn E&R is not aware of any permits that will be required to implement activities associated with the removal of the pipeline. Penn E&R has assumed that the approval of this RAWP will be the only approval/permits required by the USEPA and/or the Pennsylvania Department of Environmental Protection (PADEP) to implement the proposed remedial activities. Also, in preparation of this work plan, Penn E&R spoke directly with representatives of the Safety and Code Enforcement Office with Upper Merion Township. Based on these conversations, no permits are required from the Township for the pipeline removal activities.

Erosion and Sedimentation Issues

The Montgomery County Conservation District (MCCD) requires the implementation of a written Erosion and Sedimentation Control (ESC) Plan for excavations/earth disturbances exceeding 5,000 square feet but less than five acres. Unless mandated by permits issued by other entities, the MCCD does not require involvement in the preparation or implementation of the ESC Plan and does not require a formal permit to initiate the excavation/construction activity. Since the removal of the pipeline will likely disturb more than 5,000 square feet but less than five acres, Penn E&R has developed a written ESC Plan for this project. A copy of the ESC Plan, which was developed in accordance with the April, 2000 document developed by the Southeast Pennsylvania Association of Conservation Districts entitled "Erosion and Sedimentation Control Plan Program Manual", is included in Appendix B.

Upon approval of this work plan by USEPA and prior to implementing any other site activities, all required erosion and sedimentation control devices, as outlined in the site-specific ESC Plan included in Appendix B will be installed.

Clearing

The pipeline runs parallel and crosses a storm water drainage swale that flows west to east and empties into a regional storm water detention pond located just to the east of the Property. The swale and surrounding banks are covered with weeds and small trees, which will have to be cleared prior to initiation of the pipeline removal work. The minimum amount of clearing that can be completed to allow the removal of the pipeline will be implemented. However, at a minimum, a 10-foot wide swath will be cleared along the entire length of the pipeline. The

clearing will be completed with an excavator or similar piece of equipment that is equipped with a hydroaxe. All materials generated during the clearing will be mulched and then used on-site or shipped off-site.

Installation of a Construction Entrance and Decontamination Pad

The Property is completely developed and is occupied by a building and associated asphalt parking lots. There is an asphalt driveway from Horizon Drive that is used to access the Property. As discussed previously, the pipeline is located along the southern boundary of the Property and runs alongside a drainage swale. The swale is generally dry except during precipitation events. To allow access to the swale and the pipeline, Penn E&R will install a construction entrance at the approximate location shown on Figure 4. The construction entrance will extend from the curb of the parking lot and down the bank to the swale area. As part of the installation of the construction entrance, the top soil and grass will be removed from this area and placed on and covered with plastic. The area will then be covered with geotextile fabric followed by at least 8-inches of No. 4 stone. The construction entrance will be out 15 feet wide by 20 to 25 feet long. The construction entrance will be maintained throughout the duration of the excavation and backfilling activities. Also, a small ramp leading from the driveway and up over the curb to the construction entrance will be installed using No. 4 stone as well.

As discussed further below, the only heavy equipment that will need to access the swale area is a track excavator and a track loader. This equipment will use the construction entrance to access and exit the swale area. If and when this equipment is removed from the swale area it will first be cleaned on a decontamination pad to be constructed at the Property at the approximate location shown on Figure 4. The pad will be constructed by first placing several pieces of 3/4-inch plywood on the ground. The plywood will then be covered with 40-mil plastic and bermed on three sides with hay bails. The pad area will then be covered with plywood so the plastic is not ripped when the equipment is moved onto and off the pad. The pad will be sloped so that decontamination water accumulates in one corner of the pad, which will then be pumped into a 55-gallon drum. The containerized decontamination water will be characterized and, after notifying USEPA, properly disposed of off-site.

Waste Storage Area

As part of the remedial activities and as discussed below, approximately 700 feet of 4-inch diameter steel pipe may need to be removed. Also, if visually impacted soils are encountered, they will be removed as well. The pipe and excavated soil, if any, will be placed in the loader and moved to the construction entrance where it will be placed directly into either a lined roll-off (pipe) or a small dump truck (soil). The area where the dump truck and/or roll-off is placed will be covered with plastic. This plastic will be removed and discarded after the roll-off/dump truck is moved. Once a roll-off container is filled, it will be covered with a tarp and moved to the waste storage area, which will be located at the eastern end of the Property in an asphalt parking area. Any soils placed in the dump truck will be moved directly to the waste storage area where the soils will be placed on and covered with plastic sheeting. The pipe will be shipped off-site to a scrap dealer for recycling and any stockpiled soil will be characterized and, after notifying USEPA, properly disposed of off-site.

Security

A temporary snow fence will be installed around the waste storage area. This fence will remain in place until all waste materials generated during the removal activities have been shipped off-site for disposal. Also, caution tape will be placed around the work area (i.e., the area where pipeline is being removed) plus a 25-foot buffer each day. Only personnel who have 40-hour OSHA hazardous waste training will be allowed within this work area. Also, a temporary fence will be installed across the construction entrance at the end of each work day.

3.2 Excavation of the Pipeline

The pipeline excavation activities will be conducted, overseen and directed by personnel from Penn E&R. All Penn E&R on-site personnel will be 40-hour OSHA trained. No one will be allowed within the swale area that is not 40-hour OSHA trained. Penn E&R's Health and Safety Coordinator will oversee all on-site excavation activities to ensure that these activities are completed safely and in accordance with the requirements of the Site-Specific Health and Safety Plan (see Section 7.0). The on-site Health and Safety Coordinator will monitor ambient air for total dust and volatile organic vapors throughout the excavation activities.

The removal of the pipeline will start at the western end of the line where it goes onto/under the Williamsburg Commons property. The excavator will be positioned so that it is over the center of the pipeline and the work will proceed to the east. In this manner, only the bucket of the excavator will come in contact with the pipeline or any potentially impacted soil. Initially, the soil overlying the pipeline will be excavated and placed on plastic on the ground adjacent to the excavation. As discussed below, this soil will be used for site restoration purposes. After removing a sufficient volume of soil, the pipeline will be removed in approximately 10 to 20-foot sections. The pipe will be inspected to ensure that it does not contain any WAL. Based on previous experience removing other sections of the pipeline, the pipe will likely be empty. However, if WAL is present in the pipeline, it will be removed and placed directly into a 55-gallon drum. The portion of the pipeline in which the WAL was present will then be cleaned with a high-pressure washer and the water will be collected in a 55-gallon drum. The removed pipe will then be placed in the loader and transported to the construction entrance where it will be placed in a lined roll-off. Any drums of waste that are generated will also be transported to the construction entrance and moved to the waste storage area.

During the removal of the pipeline, the excavated soils will be visually inspected for signs of contamination (i.e., staining, tar-like material) and screened with a photoionization detector (PID) for elevated volatile organic compounds. As discussed below, post-excavation soil samples will be collected along the length of the pipeline as it is removed. The results of the analysis of these samples and the focused risk assessment to be completed, if necessary, upon receipt of the sample results will be used to determine if any soil needs to be subsequently remediated. However, if visually impacted soils (i.e., staining, tar-like material) are encountered during the pipe removal work they will be excavated and removed along with the pipeline. The soils will be transported directly to the construction entrance with the loader and they will be placed in the dump truck and transported to the waste storage area.

As shown on Figure 3 and discussed in Section 2.0, the geophysical survey suggests that the pipeline stops abruptly about 125 feet from the eastern Property line. Also, a section of the pipeline may be missing near the western end of the known extent of the pipeline on the Property. Therefore, if the pipeline is not encountered in these areas, test pits will be excavated perpendicular to the projected alignment of the pipeline at 50-foot intervals in each area. These test pits will be installed at the approximate locations shown on Figure 5. If required, the test pits will be excavated to 2 feet below the deepest depth at which the pipeline is encountered during its removal and each will be approximately 20 feet long. If pipe is encountered in any of the test pits, it will be removed as described above and then post-excavation samples will be collected as described below. If no pipe is encountered, post-excavation sampling in these areas will be implemented as described below.

As indicated above, the pipeline will be removed in an easterly direction starting at the point where the pipeline leaves the Property and runs onto/under the Williamsburg Commons property. The pipe at the boundary between the two properties will be capped with an appropriately sized, mechanical, self-expanding plug. If the pipeline is determined to extend to the eastern property boundary, the end of the pipe at this end of the Property will also be plugged.

The loader and excavator will remain inside the swale area at all times. If they need to be removed from this area prior to the completion of the removal activities and at the completion of the excavation activities, the equipment will be cleaned with a high-pressure washer on the decontamination pad. Water generated during this process will be placed in 55-gallons drums. The containerized decontamination water will be characterized and, after notifying USEPA, properly disposed of off-site.

The pipeline removal work will be completed during a period of projected clear weather so that the removal activities are not hampered by precipitation events. However, as discussed in the following sections, post-excavation soil samples and restoration of the swale area will proceed as the pipe is removed.

3.3 Post-Excavation Soil Sampling

To ensure that remaining soils do not present an unacceptable risk to human health, post-excavation soil samples will be collected as the pipeline is removed. The post-excavation samples will be collected as discussed below but sample locations will be biased to joints in the pipeline, areas of the pipeline displaying corrosion or areas displaying visual evidence of impact.

One post-excavation soil sample will be collected along the center line below the former pipeline (i.e., the 0 to 6-inch interval located directly below the former pipe or the bottom of the excavation if over excavation was required) at 50-foot intervals. Also, two additional post-excavation soil samples will be collected at 100-foot spacings or at the mid-point of each section of pipeline if the segment is less than 100 feet. These samples will be collected from the sidewalls of the excavation. The depth at which the sidewall samples are collected will be based on field screening results and the depth at which the pipe is encountered, but sample locations will be biased to areas adjacent to joints or obvious evidence of impacts. Also, the spacing of

these sidewall samples may be modified in the field based on the spacing and presence of couplings/joints in the pipe and/or obvious signs of impact.

In areas where the pipe was not encountered but should have been present, the center line and depth of the pipeline will be extrapolated. One post-excavation soil sample will then be collected along the center line below the extrapolated depth of the former pipeline (i.e., the 0 to 6-inch interval located directly below the extrapolated depth of the former pipe) at 50-foot intervals. Also, one set of two soil borings will be installed at 100-foot spacings. These borings will be located about 10 feet outward in both directions perpendicular to the extrapolated location of the former pipeline. The soil borings will be extended to a depth of approximately 6 feet below the original topography. One soil sample will be collected from each boring. The samples will either be collected from the extrapolated depth of the pipe or the samples will be biased and collected at the depth where visually impacted soils or elevated PID readings are encountered.

Based on this sampling protocol and the length of the pipeline, twenty eight post-excavation soil samples will be collected beneath/adjacent to the former pipeline. The locations at which the proposed post-excavation soil samples will be collected are shown on Figure 6.

The post-excavation soil samples will be collected using a decontaminated stainless steel hand-held bucket auger or spoon. Only grab samples will be collected; no compositing will be completed. After collection, the samples will be homogenized in a decontaminated stainless steel mixing bowl and then transferred to laboratory supplied sample bottles. The sample bottles will be placed in coolers and shipped under chain-of-custody to the contract laboratory for analysis of arsenic and the Target Compound List (TCL) semi-volatile organic compounds (SVOCs).

All post-excavation soil sample locations will be surveyed so that they can be accurately shown on subsequent site drawings.

3.4 Site Restoration

Upon collection of the post-excavation soil samples, the areas disturbed during the removal of the pipeline will be restored. As part of this work, the soil excavated to remove the pipe will be placed back in the excavation and then compacted. The remainder of the excavation will be backfilled with a mixture of rip-rap and 2A-modified stone. Also, if impacted soils are removed these areas will be backfilled with a mixture of rip-rap and 2A-modified stone. If during the pipeline removal activities it is necessary to remove any of the large boulders present in the swale or along the banks of the swale, they will be replaced. Additionally, the areas that are disturbed by the equipment used to remove the pipeline will be restored to as near original conditions as possible. The area cleared will then be reseeded and mulched or covered with hay as may be required. Any trees that may have to be removed and that are required to stabilize the bank areas will be replaced in kind.

After all equipment and wastes have been removed from the Property, the waste storage area, decontamination pad and construction entrance will be dismantled. The stone used to build the

construction entrance will be reused on-site or disposed of off-site. The plastic, geotextile fabric, wood and other materials used to construct the decontamination pad and waste storage area will be disposed of through the local municipal waste hauler.

3.5 Off-Site Disposal of Wastes

As indicated above, various wastes may be generated as part of the pipeline removal activities. These wastes could include the metal pipeline, potentially impacted soil, solidified WAL material, and/or decontamination water. No wastes will be removed from the Property until they have been properly characterized and, prior to any off-site shipment of hazardous substances to an out-of-state facility, appropriate written notifications will be made.

4.0 EVALUATION OF ANALYTICAL RESULTS

As discussed in Section 3.0, post-excavation soil samples will be collected from the pipeline area after the removal activities have been implemented. To ensure that remaining soils do not present an unacceptable risk to human health or the environment, the results of the post-excavation soil samples will be initially compared to USEPA non-residential Risk Based Concentrations (RBCs) and non-residential Medium Specific Concentrations (MSCs) developed pursuant to Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2). If the data show that no tested compounds are detected above either the USEPA RBCs or PADEP Act 2 MSCs then no further action will be required for the former pipeline area and a Remedial Action Completion Report, as discussed in Section 5.0, will be developed.

If exceedances of either USEPA RBCs or PADEP Act 2 MSCs exist then a Focused Risk Assessment (FRA) will be implemented using the results of the post-excavation samples. If required, the FRA will be completed in accordance with the procedures included in the following documents:

- USEPA 1989. Risk Assessment Guidance for Superfund (RAGS): Volume I Human Health Evaluation Manual (HHEM), Part A, Interim Final. Office of Emergency and Remedial Response, Washington, DC. EPA/540/1-89/002.
- USEPA 1998. Risk Assessment Guidance for Superfund (RAGS): Volume I Human Health Evaluation Manual (HHEM), Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments. Office of Emergency and Remedial Response, Washington, DC. EPA/540/R-97033.

This Focused Risk Assessment will use the results generated from the post-excavation samples to be collected from the pipeline area. Because the post-excavation samples will be obtained from a property zoned for commercial use and from areas that will not be developed, only potential risks to trespassers and on-site construction workers will be evaluated. The FRA will be based on the traditional four-step risk assessment process defined by the National Academy of Sciences (1983) in its report, "Risk Assessment in the Federal Government: Managing the Process". These steps were reaffirmed by the Academy in their 1994 publication titled "Science and Judgment in Risk Assessment." These steps are as follows:

- Hazard Identification/Identification of Compounds of Concern
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization

The activities to be implemented as part of each step of the FRA are discussed below.

Hazard Identification/Identification of Compounds of Concern

This step includes the identification of the Compounds of Concern (COC) that will be evaluated as part of the FRA. As discussed above the results of the analysis of the post-excavation soil

samples will be initially compared to USEPA non-residential RBCs and PADEP non-residential Act 2 MSCs. Those compounds detected above either USEPA RBCs or Act 2 MSCs will be identified as COC and will be evaluated as part of the FRA.

Exposure Assessment

The exposure assessment evaluates the likelihood, magnitude and frequency of exposure to the COC, and identifies pathways and routes by which human receptors may come into contact with these constituents. The specific steps involved in the exposure assessment include the following:

- Identification of potentially exposed populations
- Identification of media of concern
- Identification of actual and potential exposure routes
- Establishment of exposure parameters
- Estimation of exposure doses

Because the post-excavation samples will be obtained from a property zoned for commercial use and from areas that will not be developed, only potential risks to trespassers and on-site construction workers will be evaluated.

The assessment will include both Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE). The RME will be based on the maximum detected amount of the COCs, or the 95 % UCL, whichever is lower. The CTE will be based on the average concentration of the COC and modified exposure assumptions developed and used by LPT during the implementation of the FRA completed as part of the remediation of the Cinder/Slag Fill Area (CSFA)..

The identified media of concern is soil. The exposure pathways to be evaluated in the FRA will include oral ingestion, dermal exposure and inhalation of fugitive dusts.

The various exposure assumptions will be essentially identical to the assumptions used in the CSFA Focused Risk Assessment. These exposure assumptions are presented below:

Exposure Pathways	Assumptions					
	Parameter	Units	RME		CTE	
			CW	TP	CW	TP
Ingestion	Ingestion rate Soil (IR-S)	Mg/day	480	200	200	100
	Exposure Frequency (EF)	Days/year	156	48 ^a	78	24 ^b
	Exposure Duration (ED)	Years	1	10 ^c	1	5 ^d
	Fraction Ingested (FI)	-	1	0.20 ^e	1	0.10 ^f

Dermal Absorption			CW	TP	CW	TP
	Adherence Factor (SMAFBP)	Mg/event	319	319	319	319
	Event Frequency	Events/day	1	1	1	1
	Exposure Frequency (EF)	Days/Year	156	48 ^a	78	24 ^b
	Exposure Duration (ED)	Years	1	10 ^c	1	5 ^d
	Fraction Exposure		1	0.20 ^e	1	0.10 ^f
Inhalation						
	Inhalation Rate (IN)	M ³ /Hr	3.3	1.2 ^g	2.5	0.83 ^h
	Exposure Time (ET)	Hr/Day	8	1	8	0.5
	Exposure Frequency (EF)	Days/Year	156	48 ^a	78	24 ^b
	Exposure Duration (ED)	Years	1	10 ^c	1	5 ^d
General						
	Body Weight (BW)	Kg	70	70	70	70
	Averaging Time (Cancer)	Days	25550	25550	25550	25550
	Averaging Time (non-Cancer)	Days	365	3,650	365	1,825

Notes:

^a - Assume two days per week during summer months and one day per week during an additional 6 months of the year

^b - Assume one day per week during the summer months and one day every other week during an additional 6 months of the year

^c - Assume age 6 to 16

^d - Assume age 9 to 14

^e - Assume 20% of exposure is to area

^f - Assume 10% of exposure is to area

^g - Assume 1.2 M³/hour

^h - Assume 0.83 M³/hr or 20 M³ / day divided by 24 hours.

CW – Construction workers

TP – Trespassers

Toxicity Assessment

The toxicity criteria and information that relates constituent exposure (dose) to anticipated health effects (response) for each COC will be developed as part of the Toxicity Assessment. Toxicity criteria derived from dose-response data will be used in the Risk Characterization to estimate the carcinogenic and non-carcinogenic risks associated with exposure to the COCs.

Toxicity criteria used in this FRA will be obtained from USEPA's Integrated Risk Information System (IRIS) on-line database and other appropriate USEPA guidance documents. Toxicity criteria will be obtained from the following sources, listed in Descending order of use:

- IRIS (U. S. EPA, 2000)
- Health Effects Assessment Summary Tables (HEAST) (U. S. EPA, 1997)
- USEPA's National Center for Environmental Assessment (NCEA) as indicated in U. S. EPA Region III (2000)

The toxicity values used in these assessments (i.e., oral [CSFo] and inhalation [CSFi] cancer slope factors used to evaluate carcinogenic risk and oral [RfDo] and inhalation [RfDi] chronic reference doses used to evaluate noncarcinogenic risks) will be similar to those used in the CSFA Focused Risk Assessment unless that data has been updated. Available inhalation unit risk factors will be converted into inhalation slope factors and inhalation reference concentrations will be converted into inhalation reference doses in accordance with USEPA guidance. It is expected that the same toxicity values that were used in the CSFA Focused Risk Assessment will be used in this FRA, unless updated values become available.

Risk Characterization

In the final step of the risk assessment, the results of the exposure assessment (i.e., the calculated intakes) will be integrated with toxicity information, using USEPA's current approach, to derive quantitative estimates of potential risk associated with the defined exposure scenarios. Risk estimates are calculated following the standard procedures defined in USEPA's Risk Assessment Guidance for Superfund/Part A (U.S. EPA, 1989) and the results will be compared to levels of acceptable risk defined by USEPA (U.S. EPA, 1990).

Carcinogenic risk will be calculated for each COC as a product of the constituent intake and the chemical-specific carcinogenic slope factor. Under each defined scenario estimated risks for each carcinogenic constituent is summed to derive a total risk associated with a specific route of exposure (e.g., inhalation). The cumulative risk associated with all carcinogenic constituents and all routes of exposure will be calculated. The resulting risk will be compared to acceptable levels of risk defined by USEPA (1990) in the National Oil and Hazardous Substances Pollution Contingency Plan (i.e., 1×10^{-6} to 1×10^{-4}).

Non-carcinogenic hazard will also be calculated for each COC according to the methods described in Risk Assessment Guidance for Superfund/Part A (USEPA, 1989). A hazard quotient will be computed for each constituent by determining the ratio of the calculated chemical intake to the appropriate reference dose. Hazard indices (HI) will then be calculated as

the sum of all appropriate hazard quotients, to fully evaluate the potential non-carcinogenic hazard associated with a defined exposure. If necessary, hazard indices will be segregated according to target organ effect to more accurately assess the potential for adverse health effects to occur as a result of the defined conditions of exposure. The non-carcinogenic hazard indices (Organ Specific) will be compared to USEPA's acceptable level of 1.0. Any HI less than unity will be deemed acceptable, and any HI in excess of unity represents the potential for human adverse health effects.

As indicated above, the only and most appropriate exposure pathways to be included in the FRA are trespassers and on-site construction worker. If these are the only pathways evaluated, institutional controls associated with the future use of this portion of the Property will be evaluated. If institutional controls are determined to be required, they will be submitted to USEPA for review and approval, and will be outlined in the Remedial Action Report.

LPT will evaluate impacts to ground water using the post-excavation soil sample results. This evaluation will follow appropriate EPA guidance but will incorporate site-specific conditions that LPT believes eliminates the potential for contaminants to impact ground water.

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5.0 REMEDIAL ACTION REPORT

Upon completion of the removal activities, a Remedial Action Report (RAR) will be developed. This report will include a discussion of the removal activities that were implemented and the results of these activities. The RAR will also include a discussion of the post-excavation sampling that was completed to verify the effectiveness of the remedial activities, and the results of the analysis of these samples. The RAR will also include a discussion of the results of the FRA. Detailed site maps will be included in the RAR that show the former alignment of the pipeline and the locations at which post-excavation soil samples were collected. As outlined in the January 2000 USEPA document entitled "Close Out Procedures for National Priorities List Sites", the RAR will contain the following information:

- Introduction
- Operable Unit Background
- Construction Activities
- Chronology of Events
- Performance Standards and Construction Quality Control
- Final Inspection and Certification
- Operation and Maintenance Activities
- Summary of Project Costs
- Operable Unit Contract Information
- Appendix A - Cost and Performance Summary
- Other Appendices

As indicated above, the results of the FRA will be presented and discussed in the RAR. If the results of the FRA indicate that the cumulative carcinogenic risks and non-carcinogenic hazard indices (HI) are less than USEPA's risk range (i.e., a carcinogenic risk of 1×10^{-6} to 1×10^{-4} and an HI of 1.0) then the RAR will indicate that no further action will be required for the former pipeline area. However, if the cumulative risk is outside the carcinogenic risk range or the HI is greater than 1, the RAR will include a Remedial Action Work Plan to include the implementation of additional delineation and/or remediation of the soils creating the unacceptable risk.

6.0 SAMPLING AND ANALYSIS PLAN

In 2001, LPT remediated an area identified as the Cinder Slag/Fill Area, which was formerly located on their 2301 Renaissance Boulevard property. This remedial work was completed under the supervision and approval of USEPA. As part of the implementation of these remedial activities, LPT developed a document entitled "Remedial Design/Remedial Action (RDRA) Work Plan for the Cinder/Slag Fill Area Located at 2301 Renaissance Boulevard in Upper Merion Township, Montgomery County, PA," dated October 10, 2001. The RDRA Work Plan was approved by USEPA and included a Sampling and Analysis Plan that was also approved by USEPA. The work proposed for implementation on the Property, as discussed in Section 3.0, will be implemented in accordance with the Sampling and Analysis Plan that was included in the aforementioned USEPA approved October 10, 2001 RDRA Work Plan. The components of the October 10, 2001 Sampling and Analysis Plan that have been revised to reflect the work included in Section 3.0 are discussed below.

6.1 Field Sampling Plan

The Field Sampling Plan outlines the procedures which will be followed during all on-site sampling activities. The only sampling currently anticipated to be required as part of the removal of the pipeline is post-excavation soil sampling.

6.1.1 Sampling Objective

The objectives of the post-excavation sampling is to confirm that all potentially impacted material has been removed and that soils remaining in the area of the former pipeline after its removal do not present an unacceptable risk to human health or the environment.

6.1.2 Post-Excavation Sample Location and Frequency

To verify the effectiveness of the removal activities, post-excavation soil samples will be collected along the length of the former pipeline. Post-excavation soil samples will be collected along the center line of the former pipeline at 50-foot intervals. In areas where the pipe was not encountered but should have been present, the center line of the pipeline will be extrapolated and post-excavation soil samples will be continued to be collected at 50-foot intervals. Also, to evaluate potential impacts to soils laterally out from the pipeline, two additional post-excavation soil samples will be collected at every other sample station or at 100-foot spacings. Both of these samples will be collected perpendicular to and 10 feet (a shorter distance may be selected based on existing topography, the presence of potential obstructions or the location of the pipe relative to the existing Property boundary) out from the pipeline; one being collected north and the other south of the pipeline. Based on this sampling protocol and the length of the pipeline, 28 post-excavation soil samples will be collected beneath/adjacent to the former pipeline. The locations at which the proposed post-excavation soil samples will be collected are shown on Figure 5.

All post-excavation soil sample locations will be surveyed so that they can be accurately shown on subsequent site drawings.

6.1.3 Quality Assurance/Quality Control Samples

The quality assurance/quality control (QA/QC) samples that will be collected as part of the removal of the pipeline include the following:

Trip Blanks

The post-excavation soil samples will not be analyzed for volatile organic compounds. Therefore, trip blanks will not need to be collected.

Equipment Rinsate Blanks

One equipment rinsate blank will be generated per twenty environmental samples collected. The equipment rinsate blanks will be collected in the field by pouring deionized water over decontaminated sampling equipment used to collect the post-excavation samples. The deionized rinsate water will be collected directly into laboratory supplied sample containers. The field rinsate blanks will be analyzed for the same compounds that the post-excavation samples are analyzed.

Blind Duplicates

One blind duplicate sample will be collected per twenty environmental samples submitted for laboratory analysis. The blind duplicate samples will be collected by generating twice the required sample volume at the selected post-excavation sample location. After homogenization, the sample containers for both the environmental sample and the blind duplicate will be filled. The blind duplicates will be analyzed for the same compounds that the post-excavation samples are analyzed.

Matrix Spike/Matrix Spike Duplicates

One matrix spike and one matrix spike duplicate will be collected per twenty environmental samples submitted for laboratory analysis. The matrix spike and matrix spike duplicates will be collected by generating three times the required sample volume at the selected post-excavation sample location. After homogenization, the sample containers for the environmental sample, matrix spike, and matrix spike duplicate will be collected. The matrix spike and spike duplicates will be analyzed for the same compounds that the post-excavation samples are analyzed.

6.1.4 Sample Designation

The environmental and blind duplicate samples will be numbered consecutively in the order that they were collected starting with sample PE-1. The locations from which the blind duplicates are collected will be recorded in the field book. Matrix spikes and matrix spike duplicates will be provided the same number that was given to the post-excavation sample location from which these samples were collected but the number will be preceded by the prefix MS for matrix spikes and MSD for matrix spike duplicates. As an example, the matrix spike and matrix spike

duplicate generated at Post-Excavation sample location #2 would be designated MS2 and MSD2, respectively. The equipment rinsate blanks will also be numbered consecutively starting with 1 but will be preceded with the prefix ERB (i.e., ERB2 for the second equipment rinsate blank collected during the remedial activities).

6.1.5 Field Screening

Each post-excavation soil sample location and surrounding areas will be visually inspected for signs of contamination. Also, the soils at each location will be screened for volatile organic vapors with a photoionization detector (PID). A 10.6 eV bulb will be used in the PID.

6.1.6 Laboratory Analyses

Each post-excavation soil sample will be analyzed for arsenic and the Target Compound List (TCL) semi-volatile organic compounds (SVOCs). The blind duplicates, equipment rinsate blanks, and matrix spike/spike duplicates to be collected as part of the post-excavation sampling activities will be analyzed for the aforementioned compounds of concern. The samples will be analyzed by CompuChem, an EPA approved CLP laboratory located in Cary, NC. The semivolatile organic analyses will be performed using USEPA Method OLM04.2 (GC/MS) and the arsenic analysis will be performed using USEPA Method ILM04.1 (ICP).

6.1.7 Sampling Equipment and Procedures

A decontaminated hand-held stainless steel bucket auger and/or trowel will be used to collect the post-excavation soil samples. The soil from the bucket auger/trowel will be transferred directly into a stainless steel mixing bowl using a stainless steel spoon or spatula. The soil in the mixing bowl will then be thoroughly homogenized using a stainless steel spoon. After homogenization, the required laboratory supplied sample bottles will be filled. All other sampling procedures outlined in Section 5.3.7 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan will be followed.

6.1.8 Sample Documentation, Handling and Shipment

All sample documentation, handling and shipment procedures will be implemented following the procedures outlined in Section 5.3.8 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.1.9 Decontamination Procedures

The decontamination procedures outlined in Section 5.3.8 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan will be followed.

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6.2 Quality Assurance Project Plan

This Quality Assurance Project Plan (QAPP) outlines the data collection and environmental measurement procedures that will be implemented during the removal of the pipeline. The objective of this QAPP is to outline the quality assurance/quality control (QA/QC) procedures that will be followed during sample collection and analysis, data reduction, validation and evaluation activities.

6.2.1 Project Description

The project will include the excavation and removal of the pipeline located on the Property and the collection of post-excavation soil samples to confirm the effectiveness of the remedial activities. The previous site characterization activities completed to investigate the possible presence of the pipeline and the results of these activities were presented in Section 2.0 and Section 3.0 includes a detailed description of the work to be implemented to remove the pipeline and the post-excavation sampling to be completed to verify the effectiveness of the remedial activities.

6.2.2 Project Organization and Responsibilities

The lead regulatory Agency for the site is USEPA Region III. Mr. Joseph McDowell is USEPA's Remedial Project Manager. PADEP will also provide technical oversight on this project.

Penn E&R is the Remedial Design/Remedial Action Contractor and will oversee the implementation of the pipeline removal activities and will complete the post-excavation soil sampling. Penn E&R will also oversee and manage all other aspects of the project, including the coordination of all subcontractors, data analysis and evaluation, and will prepare the Remedial Action Report. Penn E&R will also develop and submit all required progress reports to the USEPA/PADEP. Environmental Standards, located in Valley Forge, PA, will complete the data validation activities and CompuChem, a CLP-approved laboratory located in Cary, N.C, will be the project analytical laboratory. Both Environmental Standards and CompuChem will report directly to Penn E&R's Quality Assurance Officer. The qualifications for both Environmental Standards and CompuChem were included in the Sampling and Analysis Plan in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.3 Quality Assurance Objectives for Measurements

The Data Quality Objectives (DQOs) and the procedures to be followed to meet and maintain these objectives are outlined in Section 5.4.3 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.4 Sampling Procedures

The procedures to be followed as part of the collection of the post-excavation soil samples were discussed in detail in Section 6.1.7 of the Field Sampling Plan.

6.2.5 Sample Custody

Chain-of-custody (COC) is the process of tracking the handling of the sample from time of collection to analysis. The implementation of proper COC procedures provides defensible proof of sample and data integrity. A sample is under custody if: 1) it is in your possession; 2) it is in your view after being in your possession; 3) it was in your possession and you stored in a secured area; and/or 4) it is in a designated secured area. To ensure proper custody of the post-excavation soil samples the procedures outlined in Section 5.4.5 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan will be followed.

6.2.6 Calibration Procedures

To ensure that the data collected meets the data quality objectives, various calibration procedures will need to be completed on field and laboratory equipment. The calibration procedures to be followed are presented in Section 5.4.6 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.7 Analytical Procedures

The post-excavation soil and associated quality assurance/quality control samples (QA/QC) will be analyzed by CompuChem, a USEPA Contract Laboratory Program (CLP) approved laboratory located in Cary, N.C. Each post-excavation soil sample will be analyzed for arsenic and the Target Compound List (TCL) semi-volatile organic compounds.

6.2.8 Data Validation, Reduction and Reporting

The data validation, reduction and reporting will be implemented in accordance with Section 5.4.8 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.9 Internal Quality Control

The internal quality control (QC) checks that will be used to evaluate the precision and accuracy of analytical data are presented in Section 5.4.9 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.10 Performance and System Audits

The field and laboratory performance/system audits to be completed are detailed in Section 5.4.10 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.11 Preventive Maintenance

The field and laboratory preventive maintenance activities that will be implemented to reduce downtime and potential impacts on data quality are presented in Section 5.4.11 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.12 Procedures To Be Used To Evaluate Data Quality

The procedures to be used to evaluate data quality are presented in Section 5.4.12 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.13 Corrective Action

Corrective action is the process of identifying, recommending, approving and implementing measures to counter unacceptable procedures, deviations from approved procedures or methodologies, or out of control quality control performance that can affect data quality. The procedures to be followed to determine if corrective action is required are presented in Section 5.4.13 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

6.2.14 Quality Assurance Reports

The Quality Assurance reports that will be developed as part of the removal of the pipeline are presented in Section 5.4.14 of the Sampling and Analysis Plan included in the aforementioned October 10, 2001 RDRA Work Plan.

7.0 HEALTH AND SAFETY PLAN

7.1 Overview

The work to be completed at the Property will include the excavation and removal of the pipeline and any potentially impacted soil encountered, the collection of post-excavation soil samples, and the restoration of the disturbed area. This site-specific health and safety plan (SSHASP) was developed based on currently known conditions and represents the health and safety requirements that will be followed by all personnel on-site performing the pipeline removal and associated activities as outlined in Section 3.0. Like all sites, unknown conditions may exist and known conditions may change. Should conditions change that could possibly impact the selected personal protective equipment specified in this SSHASP, work will be stopped immediately. Work will not continue until Penn E&R's Project Manager and Corporate Health and Safety Officer have reevaluated potential risks and revised, as may be necessary, this SSHASP.

All personnel involved with the pipeline removal activities will be required to read this SSHASP carefully. All on-site personnel must follow the health and safety procedures outlined herein, be aware at all times of the heavy equipment that will be working at the Property and surrounding areas, and above all, use common sense.

All personnel that will be on the Property actively performing pipeline removal and associated activities will have current OSHA 40-hour training, including annual 8-hour refresher training, in accordance with 29CFR 1910. Personnel acting in a supervisory role will also have 8-hour supervisory training.

7.2 Designated Safety and On-Site Personnel

Personnel responsible for implementing this SSHASP include the following:

George Witmayer
Environmental Compliance Manager
Penn E&R
Office Number (215) 997-9000
Field Cellular Number (267) 718-7782
2755 Bergey Road
Hatfield, PA 19440

Frank S. Stopper
On-Site Safety Coordinator
Penn E&R
Office Number (215) 997-9000
Field Cellular Number (267) 246-1897
2755 Bergey Road
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Michael A. Christie
Project Manager
Penn E&R
Office Number (215) 997-9000
Field Cellular Number (267) 246-1897
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Hatfield, PA 19440

Thomas R. Christie
Field Operations Manager
Penn E&R
Office Number (215) 997-9000
Field Cellular Number (215) 651-5777
2755 Bergey Road
Hatfield, PA 19440

7.3 Biological, Physical, and Chemical Hazard Evaluation

There are potential biological, physical and chemical exposure hazards associated with the pipeline removal activities to be implemented at the Property.

7.3.1 Biological Hazards

The primary possible biological hazards at the Property include insects (bees, spiders, wasps, ticks), snakes and poisonous plants (poison ivy, poison sumac), and contact with soil or waste materials can lead to infected cuts. There is a potential to come in contact with poisonous plants, snakes and insects, and to a lesser degrees, waste materials. Exposure to these hazards will be minimized with appropriate standard work clothing that will be required during the pipeline removal activities (i.e., long pants, long-sleeved shirts and gloves) and general awareness of the surroundings.

7.3.2 Physical Hazards

The primary physical hazards that may be encountered during the pipe removal activities include the presence of heavy equipment (dozer and trackhoe, dump trucks) and heat stress as on-site work will be implemented during the summer months. Field personnel will be made aware of the need to be alert at all times to the hazards associated with heavy equipment, which include noise, crushing injuries, overhead hazards, and pinch points, at each daily site safety meeting. The daily safety meetings will also be used to remind and alert on-site personnel to other physical hazards that exist at the site such as slip/trip/fall hazards, weather-related hazards (lightening), puncture wounds from sharp objects, and vehicle traffic in adjacent roadways.

Working outside during the summer months in protective clothing increases the chances of heat stress for on-site personnel. The signs and symptoms of heat stress and procedures to be followed to prevent problems associated with working in the heat are summarized in Appendix B.

Prior to the initiation of any field work, the PA 1-Call System will be contacted to mark out any publicly owned utilities located in the work area. As part of this process, Penn E&R will attempt to meet on-site with representatives from PECO and Transcontinental Gas as these companies maintain easements for overhead electrical lines and underground gas pipelines just to the west of the western end of the proposed work area.

No confined space work is anticipated.

7.3.3 Chemical Hazard

No soil samples have been collected from below and/or adjacent to the portion of the pipeline located on the Property. However, Penn E&R has removed portions of this same pipeline from other properties located to the southwest of the Site as part of previous work overseen by the USEPA. Very little impact to adjacent soil was identified during these off-Property pipeline removal activities. Therefore, Penn E&R does not believe that impacted soils will be encountered during the pipeline removal activities outlined in Section 3.0. If contaminants are detected, however, they would likely consist of one and/or a combination of the compounds indicated below.

7.3.3.1 Metals

The most likely metal to be detected, if any, would include arsenic. Since the primary route of exposure for arsenic would be through the inhalation of dust, Penn E&R will ensure that the planned pipeline removal activities do not generate dust in excess of the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 10 mg/m^3 of total dust while on the Property. Under normal excavating and construction operations, this limit is very rarely exceeded for short periods of time, and almost never exceeded for an entire 8-hour period. In addition, a dust concentration of 10 mg/m^3 would create a significant dust cloud over the entire Property. To ensure that dust levels do not approach the TLV dust suppression methods as discussed below in Section 7.4.11 will be implemented and continuous monitoring downwind and within the work area using a Mini-Ram will be implemented to determine total dust concentrations. If dust levels exceed 5 mg/m^3 or visible dust is observed, work will cease, and dust control measures will be implemented.

7.3.3.2 Volatile Organic Compounds

It is possible that a few volatile organic compounds could be present in soils adjacent to the pipeline at low levels. To ensure worker safety a photoionization detector will be used to continuously screen for the possible presence of volatile organic vapors in the ambient air. If levels exceed 5 parts per million (ppm) at any point, operations will cease, and Penn E&R's

Environmental Compliance Manager will evaluate what, if any, upgrades to personal protective equipment may be required before work can commence.

7.3.3.3 Semivolatile Organic Compounds

A number of semivolatile organic compounds have been detected in soil samples collected adjacent to and/or below portions of the pipeline and recovered from off Property areas, these are the primary compounds of concern. The detected compounds have generally included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. Semivolatile compounds such as those listed above may be attached to dust particles, and would be controlled in the same manner as was outlined for metals in soil. Therefore, the dust suppression methods discussed below in Section 7.4.11 will be implemented and continuous monitoring downwind and within the work area using a Mini-Ram will be implemented to determine total dust concentrations. If dust levels exceed 5 mg/m³ or visible dust is observed, work will cease, and dust control measures will be implemented. Also, Standard Level D personal protective equipment (i.e., long sleeves and pants, boots, gloves, hard hats and safety glasses) will be worn to prevent contact with soils that may contain semivolatile organic compounds.

MSDS for the aforementioned chemicals/compounds are included in Appendix B.

7.4 General Safety Procedures

7.4.1 Security/Work Zones

A high visibility fence will be located around any excavations greater than three foot deep when the area is unattended. This fence will be maintained throughout the excavation and backfilling operations. Also, yellow caution tape will be placed around the pipeline area. The areas within the caution tape will be considered the exclusion zone. Only personnel who are 40-hour OSHA trained and have reviewed this site-specific Health and Safety Plan, and which are required to implement the remedy, will be allowed inside the exclusion zone. The construction entrance and the decontamination pad will be considered the Contamination Reduction Zone (CRZ). Personal decontamination stations will be setup and completed on the decontamination pad.

7.4.2 Site Safety Meetings

The on-site Health and Safety Coordinator will meet at the Property with all personnel prior to the initiation of the pipeline removal activities. All personnel will be required to read this SSHASP and sign the Safety Briefing Form included in Appendix B. This meeting will also be used to familiarize all personnel with the Property and explain the activities to be implemented.

Daily safety meetings will also be held at the start of each workday. These daily safety meetings will be used to discuss the day's planned activities, any problems or concerns that may have arisen during the previous day's work, current weather conditions, monitoring results from the

previous day's activities, and any changes to this SSHASP. The on-site Health and Safety Officer will conduct these daily safety meetings.

7.4.3 Personal Protective Equipment

All on-site personnel will be required to wear steel-toed boots, hard hats, gloves, and standard work clothes (i.e., long pants and sleeved shirts). Personnel who will be working around heavy equipment are required, in addition, to wear safety glasses and hearing protection. It is also recommended that personnel that may come in contact with the pipeline/soils wear latex/nitrile gloves. The on-site Health and Safety Coordinator will be responsible for identifying those on-site personnel who are required to upgrade their personnel protective equipment to include latex/nitrile gloves.

If volatile organic vapors measured by the PID exceed 5 ppm over background, or dust levels measured by the Mini-Ram exceed 5 mg/m^3 at any time during the excavation activities, work will be stopped immediately. The on-site Health and Safety Coordinator and Penn E&R's Environmental Compliance Manager will then evaluate what, if any, upgrades to personnel protective equipment may be required before work can commence again.

7.4.4 Personnel Decontamination

Personnel decontamination will be implemented in two phases as determined by the on-site Health and Safety Coordinator. The first phase will be completed in the exclusion zone and will include the removal of any gross contamination such as mud using brushes or other similar devices. All mud or other similar material removed will be left in the exclusion zone to be removed with any waste generated during the pipeline removal activities. Personnel will then complete any remaining decontamination on the decontamination pad in the CRZ.

The personnel decontamination area will be covered with plastic sheeting and will include wash tubs, brushes, water, soap, paper towels and waste baskets. After entering the personnel decontamination area, equipment will be dropped, and outer garments such as boots and gloves will be washed as required. Boots, if disposable, and outer gloves will be removed and placed in the waste basket. Personnel will then be required to wash their hands and face prior to leaving the exclusion zone.

Wash/waste waters generated during these decontamination activities will be disposed of along with the water generated during the decontamination of the heavy equipment.

7.4.5 Housekeeping

All work areas will be maintained in an orderly manner.

7.4.6 Fire Protection

All fuel for heavy equipment will be stored in appropriate containers.

7.4.7 First Aid and Medical Attention

Montgomery Hospital will provide emergency medical attention during the pipeline removal activities.

7.4.8 Tools

All tools and equipment must will be maintained in good working order and fully comply with all OSHA Safety Rules and Health Regulations for the construction industry. All equipment will be inspected on a daily basis to ensure that they meet these requirements.

7.4.9 Heavy Equipment

All heavy equipment will be inspected on a daily basis to ensure that it is in good working order. All equipment will be operated by only by qualified and experienced operators.

7.4.10 Excavations

All excavations will be maintained in accordance with OSHA regulations. All excavations will be secured at the end of each day to prevent anybody from falling into the excavations. No one will be allowed in any excavation that is deeper than 4 feet unless it has been shored or the walls of the excavation have been sloped appropriately to ensure that a cave-in will not occur.

7.4.11 Dust Suppression

A temporary water tank will be at the Property throughout the duration of the pipeline removal activities. The water will be used to periodically wet down the pipeline area and the construction entrance, as may be required, to help suppress dust. If any visual signs of dust are generated during excavation or restoration grading activities, work will be immediately stopped and the area will be thoroughly wet down.

7.5 Hazard Summary

<u>Apparent Hazard</u>		<u>Type of Facility</u>		<u>Status of Facility</u>	
Serious	_____	Mfg.	_____	Active	<u> X </u>
Moderate	_____	Dump	_____	Inactive	_____
Low	<u> X </u>	Landfill	_____	Unknown	_____
None	_____	Open	<u> X </u>	Gasoline Station	_____
Unknown	_____	Warehouse	_____		

<u>Waste Type (s)</u>	<u>Waste Characteristics</u>	<u>Type/Form of Hazard</u>
Gas _____	Toxic _____	Dust <u>X</u>
Liquid _____	Corrosive _____	Liquid _____
Sludge _____	Ignitable _____	Fumes _____
Solid _____	Volatile _____	Vapors <u>X</u>
Unknown _____	Radioactive _____	Contact _____
Other <u>Soil</u>	Reactive _____	Respiratory _____
	Unknown _____	Other _____
	Other <u>None</u>	IDLH _____

7.6 Personal Protective Equipment

Level of Protection: A _____ B _____ C _____ D X

Personal protective equipment required to be worn during the pipeline removal activities is detailed in Section 7.4.3 above.

7.7 Monitoring /Surveillance Equipment

HNU/PID <u>X</u>	Metal Detector _____
OVA/GC _____	Explosimeter _____
Drager Tubes _____	O ₂ Detector _____
Tri-Tector _____	Radiation Survey Meter _____
Mini-Ram <u>X</u>	

In order to ensure that the planned excavation activities do not generate dust in excess of the TLV, the on-site Health and Safety Coordinator will complete continuous monitoring for total dust with a Mini-Ram and for total volatile organic vapors with a photoionization detector. Monitoring for organic vapors and dust will focus on the breathing zone in areas being excavated and in downwind areas. If dust is being generated above 5 mg/m³, work will be immediately stopped and appropriate dust control measures will be implemented. In addition, if volatile

organic vapors exceed 5 ppm above background at any time, work will be stopped until Penn E&R's Environmental Compliance Manager can determine what, if any, upgrades of personnel protective equipment may be required.

7.8 EMERGENCY PHONE NUMBERS

Local Emergency

<u>Phone Numbers</u>	<u>Location</u>	<u>Phone</u>
Fire	610-265-5533	911
Police	610-265-3232	911
Ambulance	610-265-5533	911
Hospital	Montgomery Hospital, 1301 Powell Street, Norristown	
	610-270-2000 (general) or 610-270-2060 (emergency)	

Chemical trauma capability? Yes

DIRECTIONS TO HOSPITAL

Go out of the main entrance for the Property to Horizon Drive and make a right. Follow Horizon Dr. to Church Street. Make a left onto Church Street and proceed to Henderson Road. Make a right onto Henderson Road and proceed to Rt. 202. Make a right onto Rt. 202 North towards Norristown. After crossing bridge into Norristown, proceed straight on Markley Street. At fourth traffic light, make a right onto Fornance Street. Proceed to next light and make a right onto Powell Street. The hospital is located at the intersection of Powell and Fornance Streets.

Route Verified by George Witmayer

Additional Emergency Phone Contacts

PECO	(800) 841-4141
Chemtrec	(800) 424-9300
TSCA Hotline	(800) 424-9065, (202) 544-1404
AT&F (explosives info.)	(800) 424-9555
National Response Center	(800) 424-8802
Pesticide Information Service	(800) 845-7633
RCRA Hotline	(800) 424-9346
CMA Chemical Referral Center	(800) 262-8200
National Poison Control Center	(800) 942-5956
U.S. DOT	(202) 366-0656 (Day Only)
PADEP	(484)-250-5900
U.S. EPA Hotline	(800) 424-9346

7.9 Safety Equipment Checklist

Personal Protection

_____	Respirator
_____	Cartridges
_____	Type
<u> X </u>	Safety Boots
_____	Rubber Boots
_____	Coveralls (tyvek)
<u> X </u>	Coveralls (cotton)
<u> X </u>	Hard Hat

_____	PVC Rain Gear
<u> X </u>	Safety Glasses
<u> X </u>	Nitrile/Latex Gloves
_____	Viton Gloves
_____	Disposable Booties
_____	Disposable Gloves
<u> X </u>	Hearing Protection (when sound levels exceed 90 DBA)
_____	SCBA
_____	Cascade System

Monitoring and Surveillance

_____	Radiation
_____	O ₂
_____	OVA
_____	Explosimeter
<u> X </u>	HNU
_____	TLD Badges
_____	Metal Detector
<u> X </u>	Mini-Ram

Decon Equipment

<u> X </u>	Tub
<u> X </u>	Water
<u> X </u>	Garbage Can w/liner
_____	Bucket
<u> X </u>	Plastic Garbage Bags
_____	Detergent
<u> X </u>	Hand Soap

Miscellaneous

First Aid Kit	<u> X </u>
Water	<u> X </u>
Fire Extinguisher	<u> X </u>

7.10 General Safety Rules and Regulations

Safety of all employees and subcontractor personnel is our number one goal. Therefore, the following rules and regulations will apply to all work and personnel on-site.

1. PERSONAL PROTECTIVE EQUIPMENT:

- a. Hard hats must be worn at all times on the job.
- b. If required, safety glasses and/or applicable added face protection must be worn at all times on the job.
- c. The wearing of safety shoes is required. The wearing of canvas shoes, moccasins, loafers, house slippers, or any open-toed shoes on the job is prohibited.

- d. Approved hearing protection must be provided in posted high noise level areas.
- e. Approved respirators must be worn in areas of harmful dusts, gases, mists and vapors. The on-site Health and Safety Coordinator will be responsible for identifying when any such protective equipment is required.
- f. Safety belts, lanyards, lifelines and/or safety nets must be utilized in accordance with federal standards.
- g. Employees must be properly clothed for their work. Full-length trousers and long sleeve shirts are required in all areas.
- h. Hair length must conform to the safety requirements of the respective jobs and work areas.

2. HOUSEKEEPING:

- a. All work areas, passageways and walkways must be maintained in an orderly manner.
- b. Waste of all kinds, including empty bottles, shall be placed in proper containers provided for same.
- c. Scrap lumber must be piled orderly and projecting nails must be pulled or bent over to eliminate a hazard.

3. FIRE PROTECTION AND PREVENTION:

- a. "NO SMOKING" must be observed throughout the job site except in designated areas.
- b. All combustible or flammable materials must be stored, dispensed and used properly.
- c. Adequate fire protection and prevention must be maintained on-site.

4. FIRST AID AND MEDICAL ATTENTION:

- a. First aid and medical attention will only be provided by persons with valid first aid training from the U.S. Bureau of Mines, the American Red Cross or equivalent training that can be verified by documentary evidence on the site. In case of an emergency the local emergency service will be contacted to provide emergency medical attention.

5. HANDLING AND STORAGE OF MATERIALS:

- a. Materials must be stocked, racked, blocked, or otherwise secured to prevent sliding, falling, or collapse.
- b. Rigging equipment must be used properly and inspected.
- c. Safe working load must be marked clearly on all hoists, slings, chains, etc.

6. TOOLS (HAND, POWER - AND POWER - ACTUATE):

- a. All mechanical safeguards must be in use.
- b. All tools must be grounded properly or double insulated.
- c. All tools must be inspected and maintained properly including cords and wiring.
- d. All licensing laws and ordinances must be complied with.

7. ELECTRICAL:

- a. All electrical wiring and equipment must comply with NFPA, NEC and ANSI standards.
- b. All electrical wiring will be inspected daily for any defects.

8. LADDERS AND SCAFFOLDS:

- a. All ladders and scaffolds (including ropes and cables) must be inspected regularly and maintained in good condition.
- b. Scaffolds must be provided with guard-rails, mid-rails, and toe-boards.
- c. Straight ladders must be provided with safety feet and properly secured to prevent slipping, falling or sliding.

9. FLOOR AND WALL OPENINGS AND STAIRWAYS:

- a. All must be guarded properly.
- b. All stairs or platforms having four or more risers must be guarded by standard stair rail.
- c. Open-sided platforms six feet above the ground or floor must be guarded.

10. CRANES, DERRICKS AND HEAVY EQUIPMENT:

- a. All equipment must be maintained properly and inspected including cables, sleeves, slings, chains, hooks, eyes and the posting of load capacities, hand signals, operating speeds, and special instructions.
- b. Where applicable, approved rollover protection must be provided for graders, dozers, fork lifts, scrapers, tractors, etc.
- c. Noise arresters and back-up alarms must be provided, and operational.

11. MOTOR VEHICLES:

- a. All motor vehicles must have qualified operators.
- b. All vehicles must be inspected and maintained regularly and weigh limits and load sizes controlled.

12. EXCAVATIONS - SHORING, TRENCHING AND FORMS:

- a. Ladders, barricades, shoring, forms, ramps, etc., must be in accordance with OSHA regulations.

13. SIGNS AND TAGS:

- a. Signs that warn of hazards must be visible and posted properly.
- b. Accident prevention tags must be used as a temporary means of warning employees of an existing hazard.

14. EXPLOSIVE BLASTING:

- a. State regulations must be observed.
- b. Prior approval must be obtained from the Safety and Industrial Hygiene Department and the appropriate Operating Superintendent.

15. FLAMMABLE GASES AND LIQUIDS:

- a. Proper storage practices must be maintained.
- b. Fire protection must meet all standards for storage areas.
- c. All containers and storage areas must be identified properly.

ORIGINAL

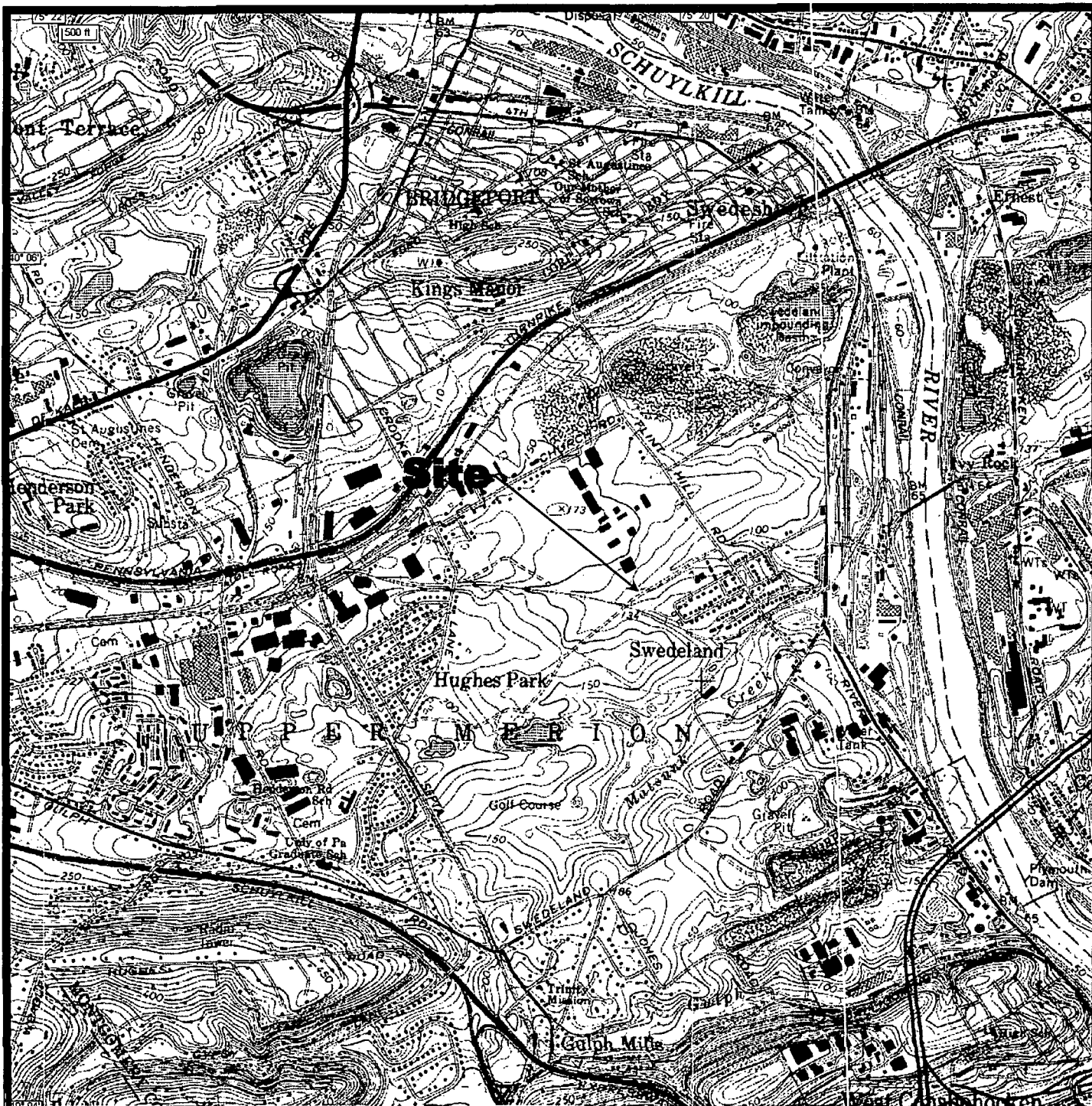
The following regulations must be complied with:

1. Permit for Cutting and Welding with Gas or Electric Equipment.
2. Permit for Entering Tank, Manhole, Pipeline, Pit, or Closed Vessel.
3. Railroad and Blue Flag Regulations.
4. Fire Boxes and Alarms.
5. Mobile Equipment Operating Rules.
6. Electrical Lockout Procedure.

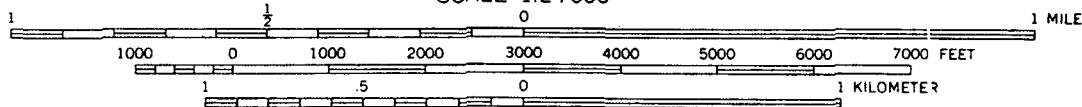
8.0 PROJECT SCHEDULE

The pipeline removal work will be initiated within one week of receiving EPA's approval of this work plan. The site preparation work (i.e., clearing, construction of the decontamination pad and installation of erosion and sedimentation control measures) will require approximately three weeks to complete. The pipeline removal work will be initiated immediately upon completion of the site preparation activities and will require approximately two weeks to complete. Allowing three weeks for receipt of the results of the analysis of the post-excavation soil samples and assuming no additional remediation is warranted based on the Focused Risk Assessment, the Remedial Action Report will be provided to EPA approximately twelve weeks after receiving approval of this work plan. If additional remediation is warranted, an updated project schedule will be provided to EPA. To the extent weather delays impact this schedule we will notify the EPA Project Coordinator. Liberty will notify Williamsburg Commons, the adjoining property owner, of this Project Schedule promptly upon receipt of EPA approval of this workplan.

ORIGINAL



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Source: www.terraser.com/ www.topozone.com/; USGS Norristown Quadrangle.



Penn E&R
Environmental & Remediation, Inc.

Hatfield, Pennsylvania 19440
215-997-9000 fax 215-822-8575

FIGURE 1

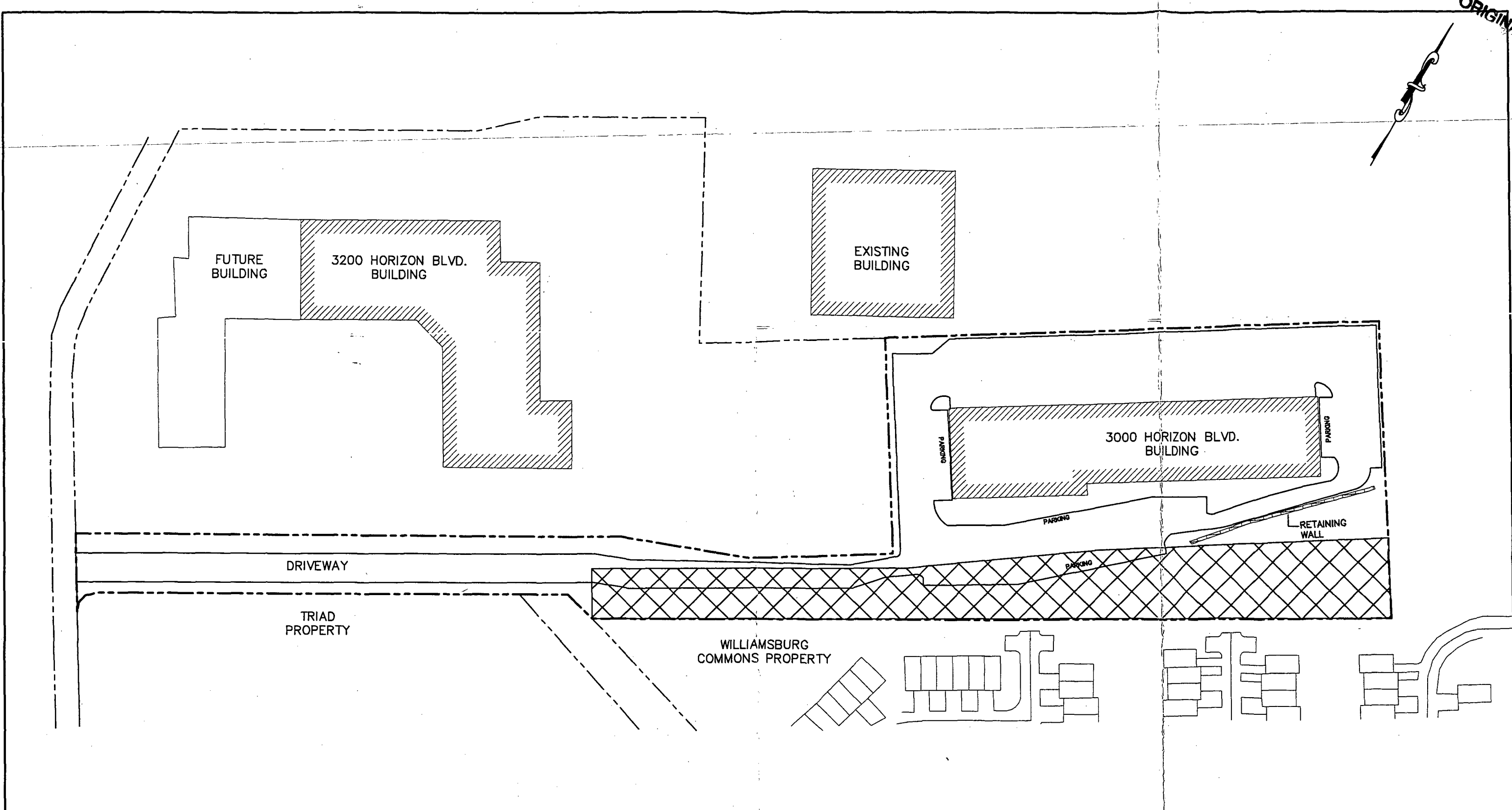
SITE LOCATION MAP
3000 HORIZON BOULEVARD, KING OF PRUSSIA
UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

Date:
26-APR-05

Project Number:
HA 4013-LPT

Scale:
1"=2000'+/-

ORIGINAL



LEGEND:
--- PROPERTY BOUNDARY
XXXXX AREA OF INVESTIGATION



Penn E&R

Environmental & Remediation, Inc.

COST EFFECTIVE ENVIRONMENTAL SOLUTIONS

2755 BERGEY ROAD, HATFIELD, PA 19440

(215) 997-9000

359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15086

(724) 934-3530

DWG NO.
HA 4013-007

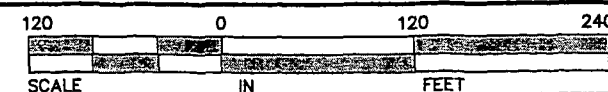
DRW BY
MD

DATE
29-APR-05

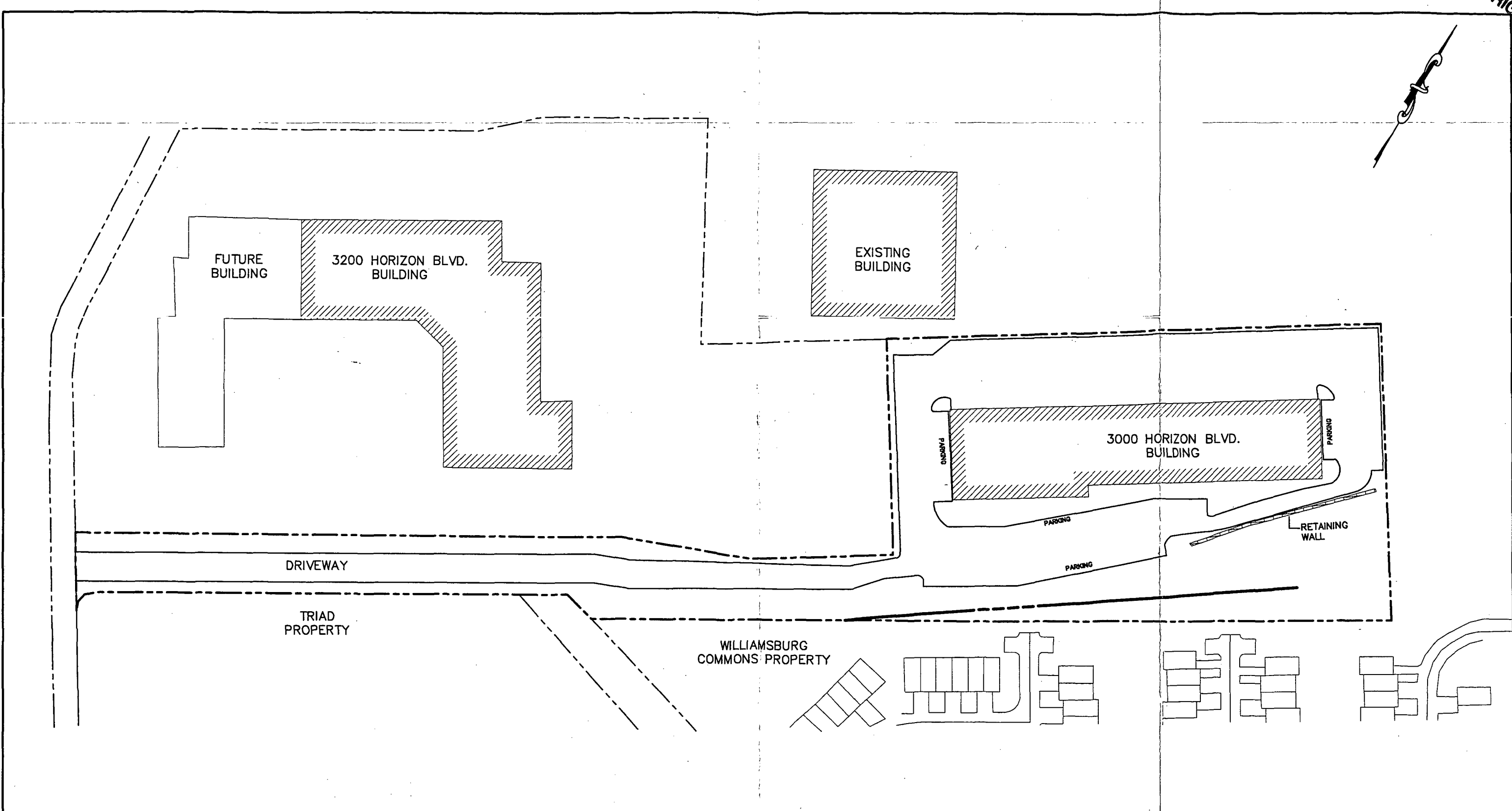
SCALE
1"=120'

FIGURE 2
SITE LAYOUT MAP
SHOWING AREA OF INVESTIGATION


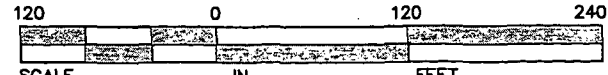
3000 HORIZON BOULEVARD PROPERTY
UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA



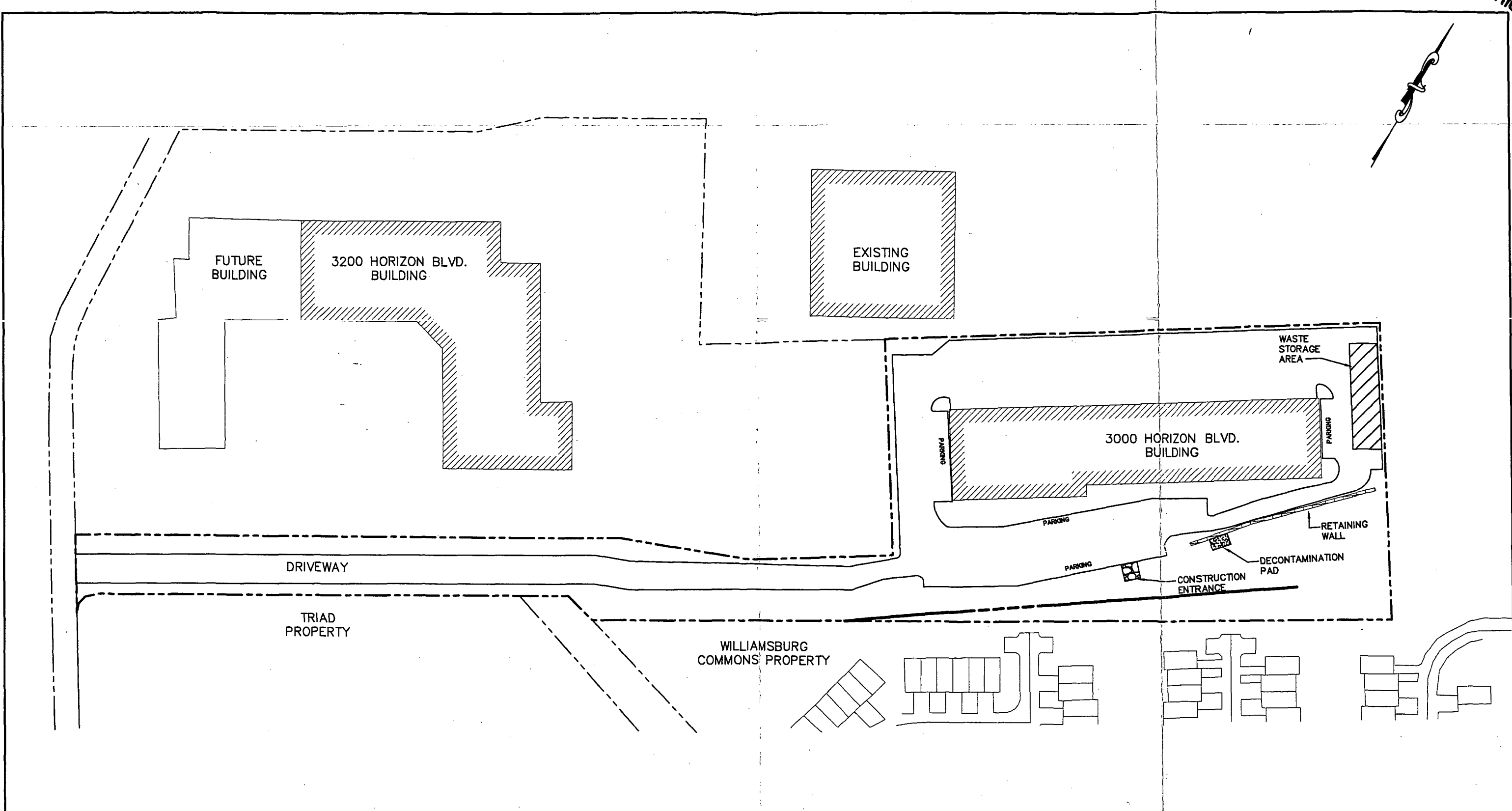
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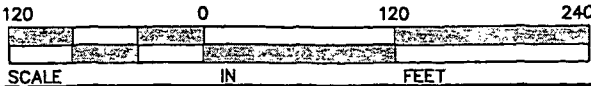
- LEGEND:
- PROPERTY BOUNDARY
 - SUSPECTED BURIED PIPE
 - POSSIBLE SECTION OF MISSING PIPE

 Penn E&R Environmental & Remediation, Inc. COST EFFECTIVE ENVIRONMENTAL SOLUTIONS 2755 BERGEY ROAD, HATFIELD, PA 19440 (215) 997-9000 359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15086 (724) 934-3530	DWG NO. HA 4013-008	FIGURE 3 SITE LAYOUT MAP SHOWING THE ALIGNMENT OF THE PIPELINE BASED ON THE RESULTS OF THE GEOPHYSICAL SURVEY 3000 HORIZON BOULEVARD PROPERTY UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA
	DRW BY MD	
	DATE 27-APR-05	
	SCALE 1"=120'	
 SCALE IN FEET		

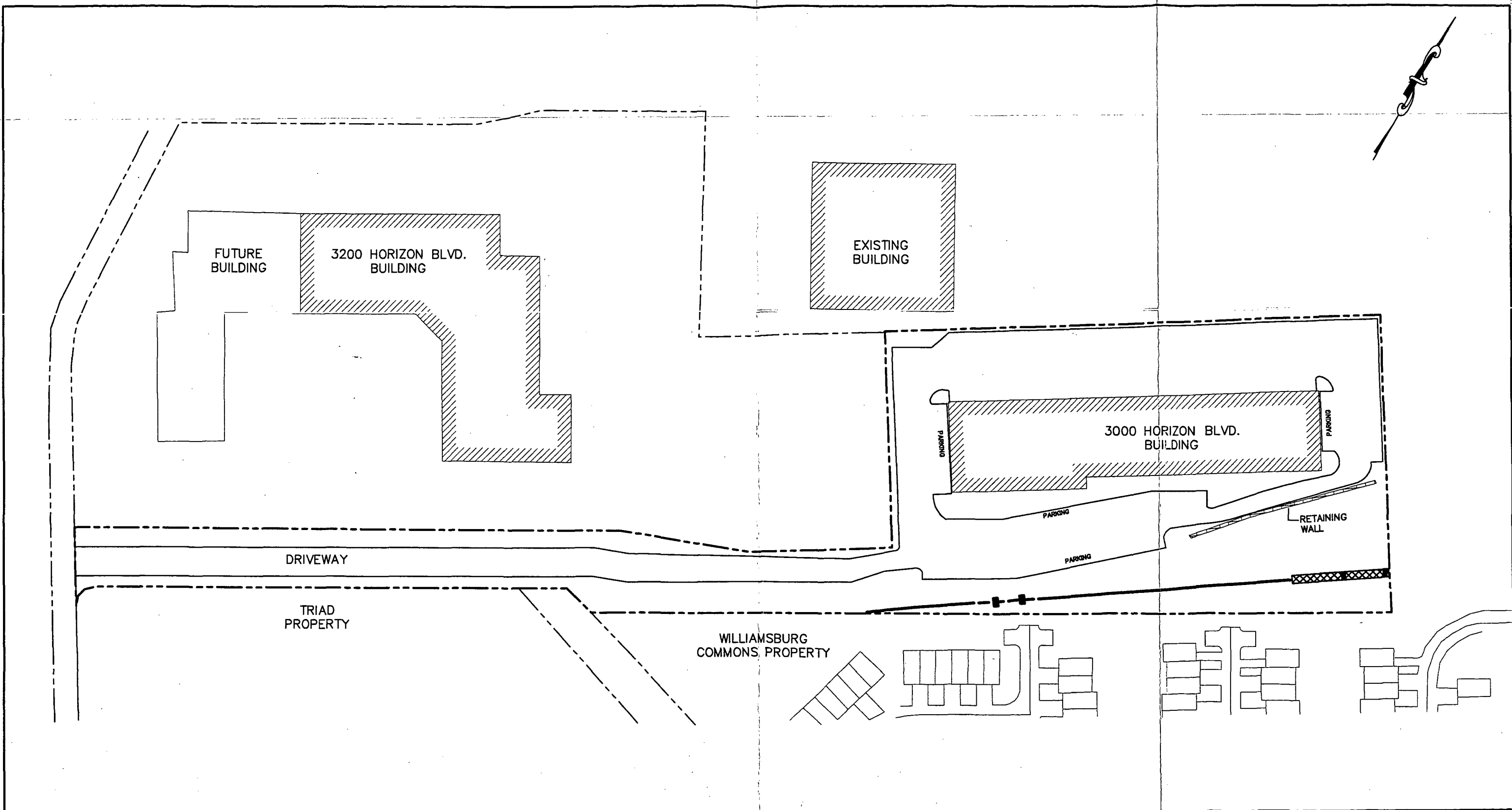
ORIGINAL




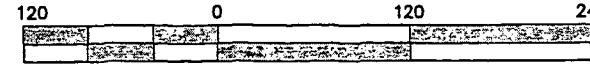
LEGEND:
- - - - - PROPERTY BOUNDARY
- - - - - SUSPECTED BURIED PIPE
- - - - - POSSIBLE SECTION OF MISSING PIPE

 Penn E&R Environmental & Remediation, Inc. COST EFFECTIVE ENVIRONMENTAL SOLUTIONS 2755 BERGEY ROAD, HATFIELD, PA 19440 (215) 997-9000 359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15066 (724) 934-3530	DWG NO. HA 4013-005	FIGURE 4 SITE LAYOUT MAP SHOWING THE LOCATIONS OF THE CONSTRUCTION ENTRANCE, DECONTAMINATION PAD AND WASTE STORAGE AREA 3000 HORIZON BOULEVARD PROPERTY UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA
	DRW BY MD	
	DATE 29-APR-05	
	SCALE 1"=120'	
		

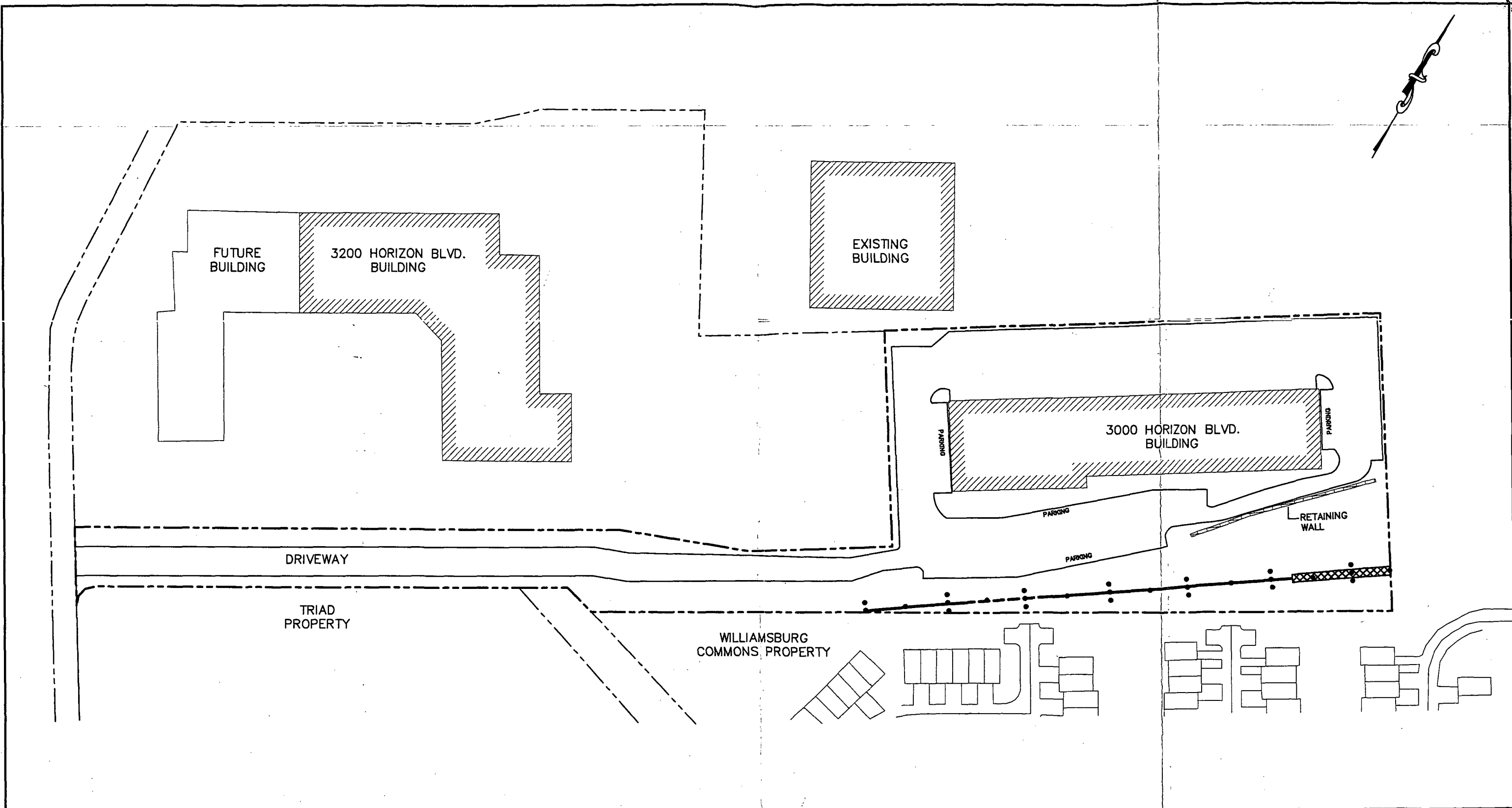
ORIGINAL





- LEGEND:**
- PROPERTY BOUNDARY
 - SUSPECTED BURIED PIPE
 - - - POSSIBLE SECTION OF MISSING PIPE
 - XXXXX EXTRAPOLATED ALIGNMENT OF MISSING PIPE
 - PROPOSED TEST PIT LOCATION

 Penn E&R Environmental & Remediation, Inc. COST EFFECTIVE ENVIRONMENTAL SOLUTIONS 2755 BERGEY ROAD, HATFIELD, PA 19440 (215) 997-9000 359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15066 (724) 934-3530	DWG NO. HA 4013-010	FIGURE 5 SITE LAYOUT MAP SHOWING ALIGNMENT OF PIPELINE AND POSSIBLE LOCATION OF TEST PITS 3000 HORIZON BOULEVARD PROPERTY UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA
	DRW BY MD	
	DATE 27-APR-05	
	SCALE 1"=120'	
 SCALE IN FEET		

ORIGINAL



- LEGEND:
- PROPERTY BOUNDARY
 - POST EXCAVATION SOIL SAMPLE LOCATION
 - SUSPECTED BURIED PIPE
 - POSSIBLE SECTION OF MISSING PIPE
 - XXXXX EXTRAPOLATED ALIGNMENT OF MISSING PIPE

 Penn E&R Environmental & Remediation, Inc. COST EFFECTIVE ENVIRONMENTAL SOLUTIONS 2755 BERGEY ROAD, HATFIELD, PA 19440 (215) 997-9000 359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15086 (724) 934-3530	DWG NO. HA 4013-011	FIGURE 6 SITE LAYOUT MAP SHOWING POST EXCAVATION SOIL SAMPLE LOCATIONS 3000 HORIZON BOULEVARD PROPERTY UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA
	DRW BY MD	
	DATE 29-APR-05	
	SCALE 1"=120'	
 SCALE IN FEET		



ORIGINAL

**Final Report
Geophysical Survey
Buried Steel Pipe Detection/Delineation
Approximately 800' x 30' Survey Area
3000 Horizon Boulevard
King of Prussia (Upper Merion Township), PA
Enviroscan Project Number 010513**

**Prepared For: Penn Environmental & Remediation, Inc..
Prepared By: Enviroscan, Inc.
March 28, 2005**





ORIGINAL

March 28, 2005

Mr. Thomas Christie
Penn Environmental & Remediation, Inc.
2755 Bergey Road
Hatfield, PA 19440

RE: Geophysical Survey
Buried Steel Pipe Detection/Delineation
Approximately 800' x 30' Survey Area
3000 Horizon Boulevard
King of Prussia (Upper Merion Township), PA
Enviroscan Project Number 010513

Dear Mr. Christie:

Pursuant to our proposal dated January 13, 2005, Enviroscan, Inc. (Enviroscan) has completed a geophysical survey of the above-referenced site on March 8, 2005. The methods and results of the survey are described below.

Survey Purpose and Site Description

The purpose of the survey was to detect and delineate a suspected buried steel pipe beneath the site. According to the client's prescribed workplan developed by others, the survey involved a reconnaissance-level electromagnetic (EM) survey to detect any buried metallic material within the survey boundaries.

The site consisted of a long thin area on the southern property line of 3000 Horizon Boulevard, Upper Merion Township, PA. The area measured approximately 1000 feet long with a width that varied from 30 to 70 feet (see Figure 1). This area was roughly centered on a storm drainage swale that runs the length of the southern property boundary. The client brush-cut survey lines at approximate twenty-foot intervals throughout the survey area perpendicular to the suspected route of the buried steel pipe (Figure 1). In some cases, note that full traverses across the swale were not possible due to obstacles, extremely poor footing (e.g. slippery mud and rocks creating unsafe survey conditions), and vegetation.



Mr. Christie
March 28, 2005
Page 2

Survey Methods

In order to provide detection of large subsurface metallic targets while minimizing interference from surficial debris, Enviroscan performed an electromagnetic (EM) terrain conductivity and metal detection survey using a Geonics, Ltd. EM-31 instrument.

EM

Enviroscan performed EM mapping of the site using a Geonics EM-31 instrument. The EM-31 was selected since (as described below) it is sensitive to buried metal, but is also sensitive to minor changes in the electrical conductivity of subsurface materials in the absence of metal (i.e. due to non-metallic debris and/or anomalous ionic content of any soil moisture).

The EM-31 employs an electromagnetic transmitter coil to induce an electric current in the earth. This current creates a secondary electromagnetic field that is measured by a receiver coil at a fixed separation of 3.7 meters from the transmitter coil. The secondary electromagnetic field has two components: the quadrature component, which is proportional to the bulk electrical conductivity or terrain conductivity (in millimhos per meter) of the subsurface materials, and the inphase component (in parts per thousand or ppt), which is primarily a measure of the relative concentration of metallic material in the subsurface. Note that in the presence of extremely high terrain conductivity material, the dynamic range of the EM-31 can be exceeded (or "saturated"), and the instrument will register spurious negative conductivities (a physical impossibility). These negative conductivities therefore actually represent very high positive conductivities. Similar saturation in the presence of significant metal can cause a spurious negative inphase response that should also be interpreted as a very high positive value.

Mr. Christie
March 28, 2005
Page 3

For this survey, Enviroscan employed an EM-31 in vertical dipole mode. The effective survey depth of the EM-31 is depicted in Appendix A. The instrument is almost completely insensitive to material at the ground surface, and has a peak sensitivity to material at a depth of approximately five feet (see incremental sensitivity curve in Appendix A). Below five feet, the sensitivity diminishes approximately logarithmically. The cumulative effect of this varying sensitivity is also depicted in Appendix A. As the cumulative sensitivity curve shows, approximately 80 percent of the signal originates at depths less than 25 feet. Therefore, the terrain conductivity or inphase response measured by the EM-31 in vertical dipole mode represents primarily subsurface electrical properties at a depth of five feet (plus or minus), with little contribution from material at the ground surface, and moderate (and diminishing) contribution from materials down to approximately 25 feet. The vertical dipole EM-31 was selected to screen out the potentially time-varying effects of surficial variations in ground cover (noted above), while maintaining a significant effective survey depth.

The EM survey was completed by collecting vertical dipole mode terrain conductivity and inphase data along client designated traverses, oriented perpendicular to the suspected path of the pipe. Along survey traverses, measurement stations were defined by automatically triggering matching inphase and conductivity readings at one-second intervals as the instrument was hand-carried.

The actual location of each measurement station was digitally recorded using a backpack-mounted Trimble Pathfinder global positioning system (GPS) receiver in contact with six to eight position-fixing satellites. The GPS positions were differentially corrected using data from a U.S. Coast Guard radio beacon. The resulting differential GPS (DGPS) positions have a nominal accuracy of better than 2 feet (+/-). The EM stations are depicted as black crosses in Figure 1. Note that only every other station is depicted.

The EM inphase and terrain conductivity data were contoured using the statistical kriging routine in SURFER by Golden Software. The terrain conductivity and inphase response contours are depicted in Figures 2 and 3, respectively. Note that the conductivity contour levels are presented as shades of light to dark red for increasing positive values and cross hatch pattern for increasingly negative values (the equivalent of very high positive values — see above). The inphase contour levels are presented as shades of green to red for increasing positive values and green to blue for increasingly negative values (the equivalent of very high positive values — see above).

Mr. Christie
March 28, 2005
Page 4

Results

EM

The EM survey results are depicted in Figures 2 and 3, showing the terrain conductivity and inphase results, respectively. As noted above, the main focus of this survey was to locate and delineate a suspected steel pipe. Examination of the contoured terrain conductivity and inphase data reveal two areas where several dipole or paired high/low anomalies, commonly associated with a linear metallic object oriented perpendicular to the EM-31 sensor array, aligned to create a linear anomaly. The dashed lines on Figures 2 and 3 indicate sections where the EM anomalies are weak or not present compared to those to the east or west, possibly resulting from missing pipe sections. Please note that the area in the center of Figure 2 indicating corrupted terrain conductivity data resulted from misalignment of the sensor array following a fall that the geophysicist took during the survey; however, the inphase portion (Figure 3) of the data set was not affected, and effectively fills in the lost data segment.

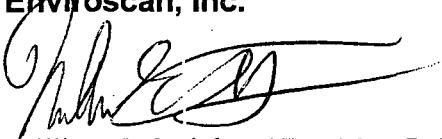
Limitations

The geophysical survey described above was completed using standard and/or routinely accepted practices of the geophysical industry and equipment representing the best available technology. Enviroscan does not accept responsibility for survey limitations due to inherent technological limitations or site-specific conditions. However, we make every effort to identify and notify the client of such limitations or conditions.

Mr. Christie
March 28, 2005
Page 5

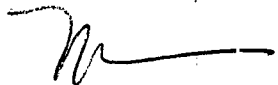
We have appreciated this opportunity to have worked with you. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,
Enviroscan, Inc.



William E. Steinhart III, M.Sc., P.G.
Geophysics Project Manager

Technical Review By:
Enviroscan, Inc.



Felicia Kegel Bechtel, M.Sc., P.G.
President

enc.: Figure 1: EM-31 Survey Data Coverage
Figure 2: EM-31 Terrain Conductivity Data Contours
Figure 3: EM-31 Inphase Response Data Contours
Appendix A: EM-31 Vertical Dipole Mode Depth Response

ORIGINAL

Figure 1

**EM-31 Survey
Data Coverage**

**Geophysical Survey
3000 Horizon Boulevard Site
King of Prussia, PA**

**Enviroscan, Inc.
Project No. 010513
Rev. 3/23/05**

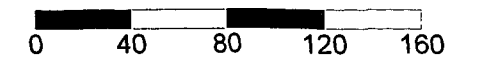


Legend

- — — Property Boundary
- + + + + + EM-31 Survey Stations



Scale (ft)

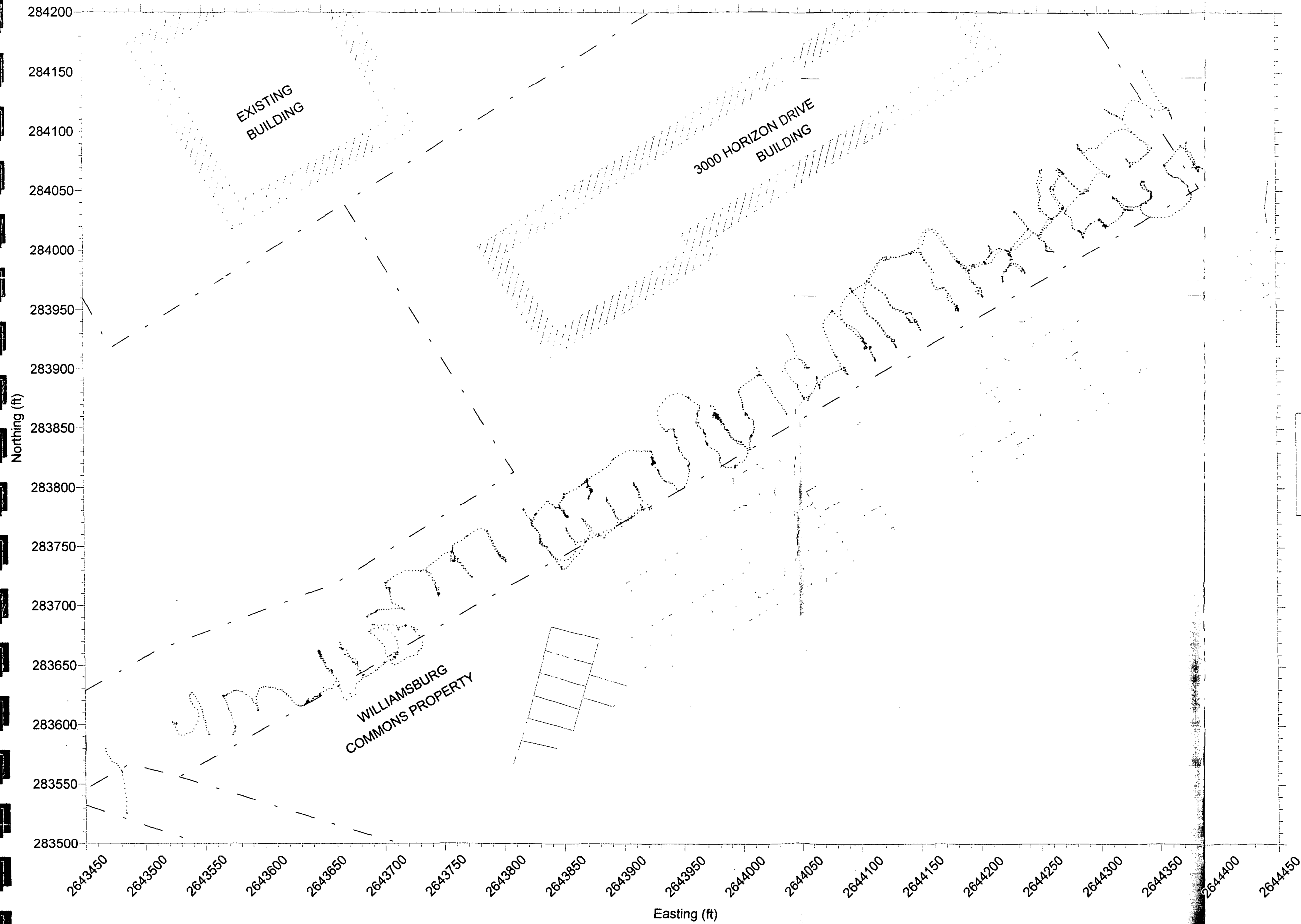


Notes:

Data from Geonics, Ltd. EM-31
instrument in vertical dipole orientation.

Basemap features modified from drawing
HA 4013-008.DWG by Penn E&R,
dated 21-JAN-05.

Survey station locations from DGPS
survey by Enviroscan, Inc.



ORIGINAL

Figure 2

EM-31 Terrain Conductivity
Data Contours

Geophysical Survey
3000 Horizon Boulevard Site
King of Prussia, PA

Enviroscan, Inc.
Project No. 010513
Rev. 3/23/05

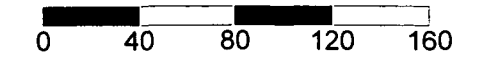


Legend

- Property Boundary
- Suspected Buried Pipe
- Suspected Buried Pipe (Possible Missing Section)



Scale (ft)

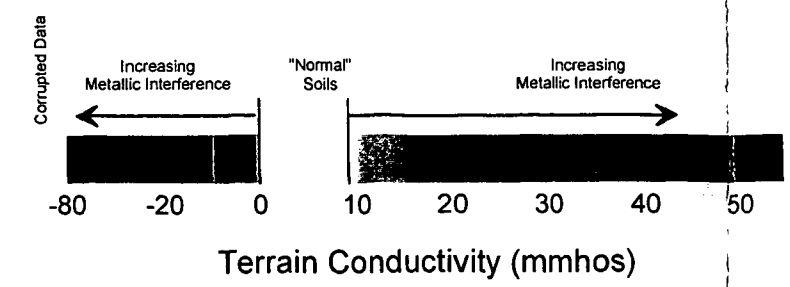
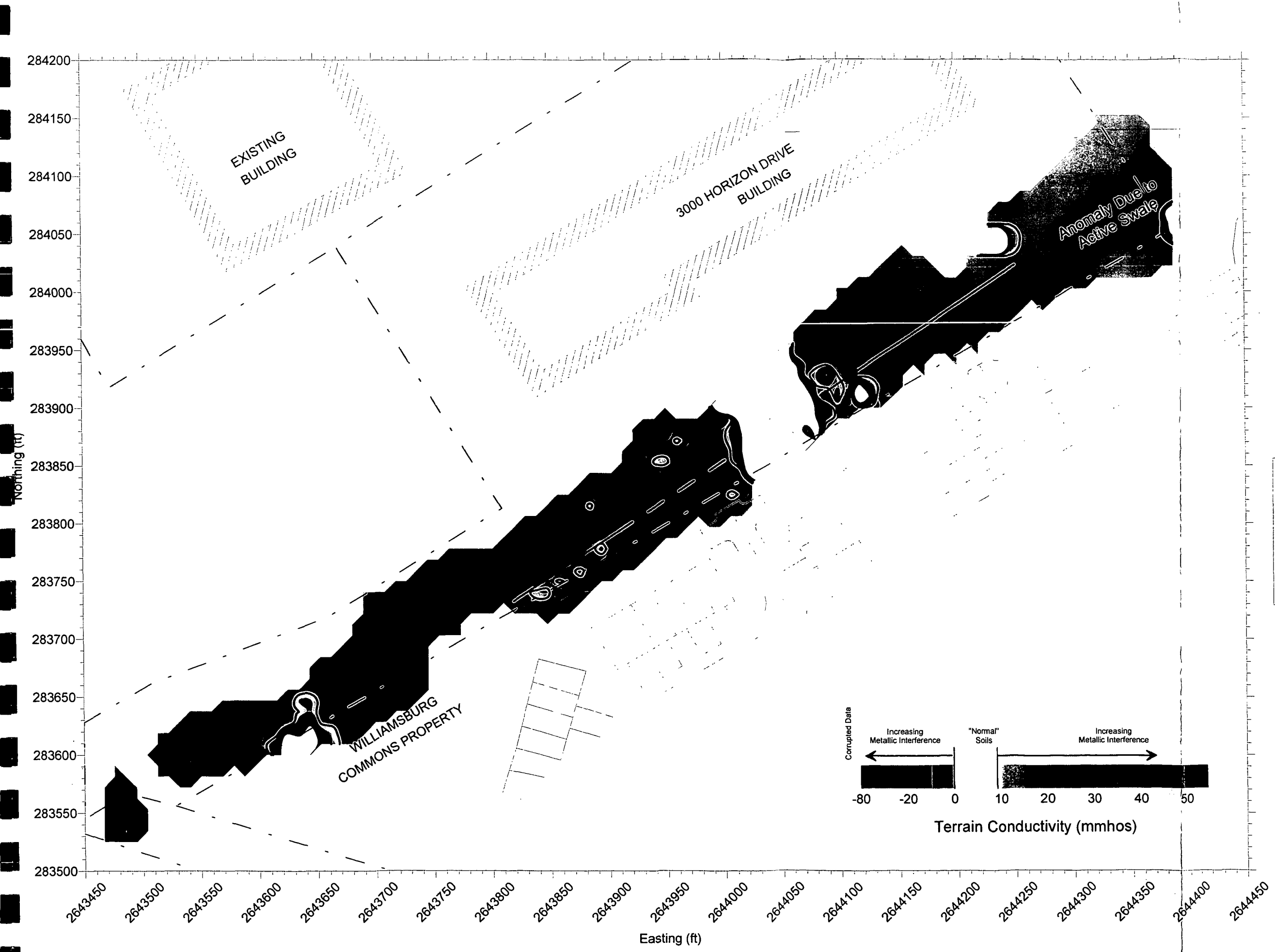


Notes:

Data from Geonics, Ltd. EM-31
instrument in vertical dipole orientation.

Basemap features modified from drawing
HA 4013-008.DWG by Penn E&R,
dated 21-JAN-05.

Survey station locations from DGPS
survey by Enviroscan, Inc.



ORIGINAL

Figure 3

EM-31 Inphase Response
Data Contours

Geophysical Survey
3000 Horizon Boulevard Site
King of Prussia, PA

Enviroscan, Inc.
Project No. 010513
Rev. 3/23/05

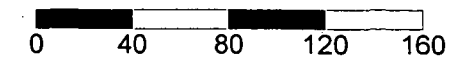


Legend

- Property Boundary
- Suspected Buried Pipe
- Suspected Buried Pipe
(Possible Missing Section)



Scale (ft)

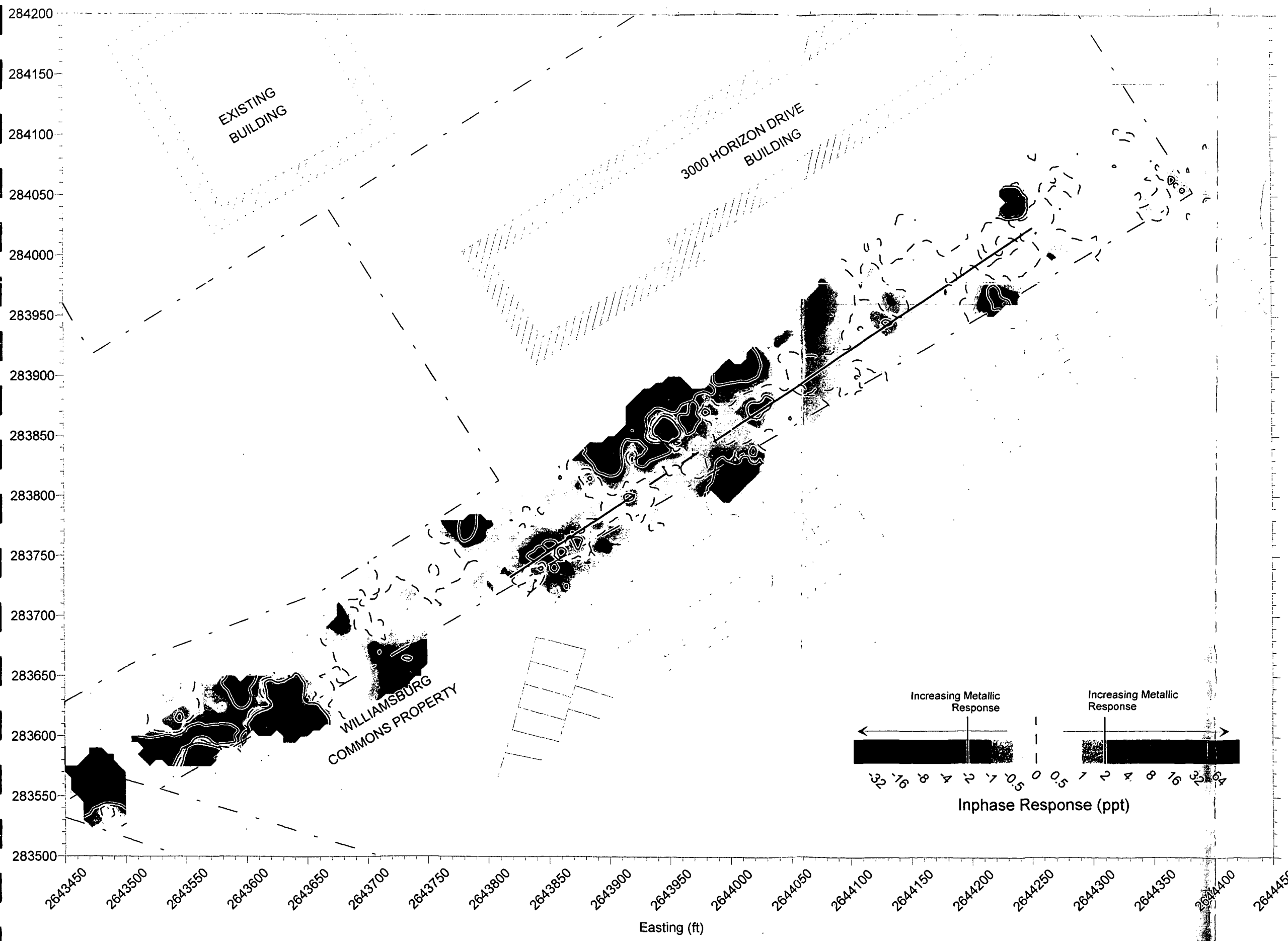


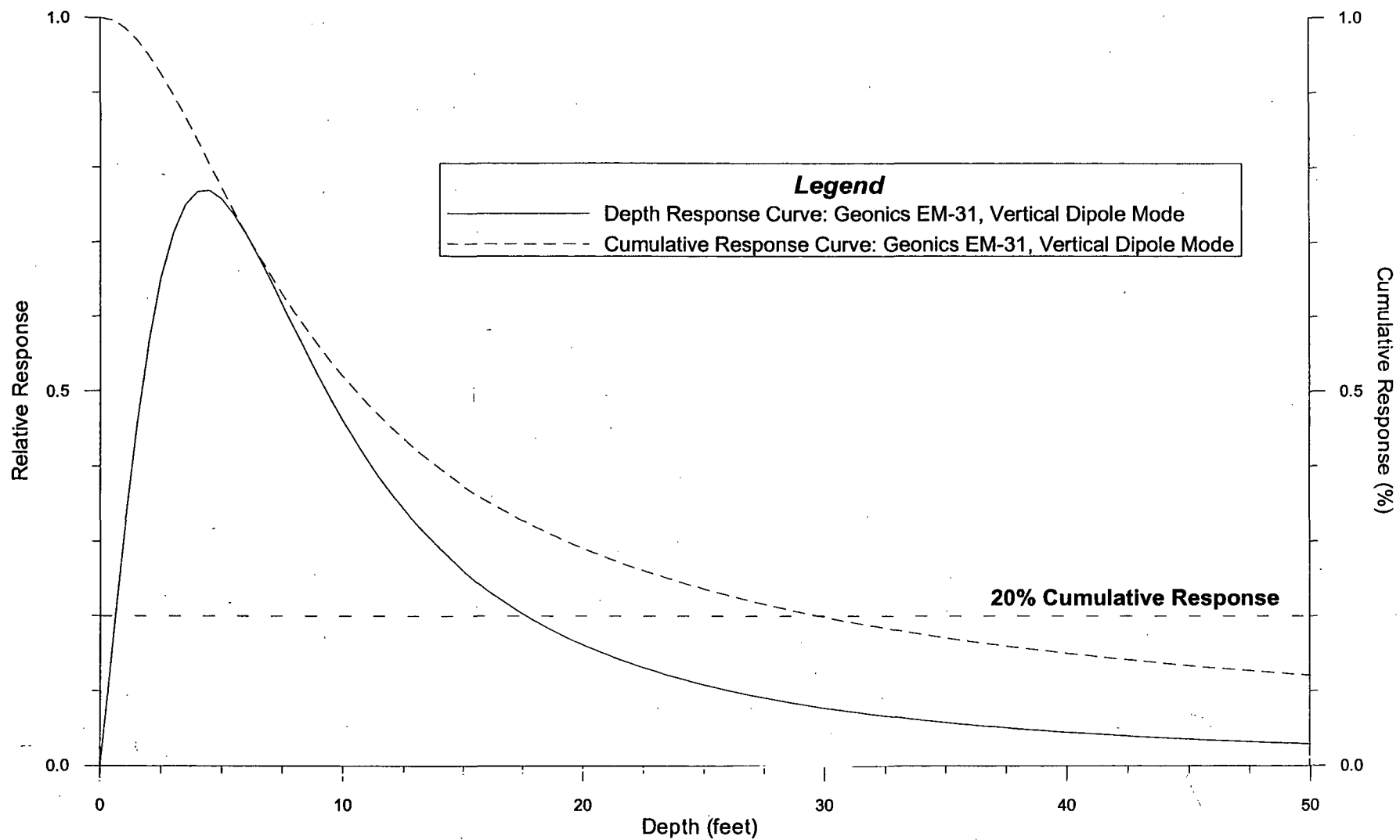
Notes:

Data from Geonics, Ltd. EM-31
instrument in vertical dipole orientation.

Basemap features modified from drawing
HA 4013-008.DWG by Penn E&R,
dated 21-JAN-05.

Survey station locations from DGPS
survey by Enviroscan, Inc.





EM-31 Vertical Dipole Mode Depth Response

Revised 01/2001



ORIGINAL

**EROSION AND SEDIMENT CONTROL PLAN
FOR THE WASTE AMMONIA LIQUOR (WAL) PIPELINE
3000 HORIZON DRIVE
UPPER MERION TOWNSHIP, PENNSYLVANIA**

1. **Name of Responsible Individual:** Michael A. Christie, P.G.
Address: 2755 Bergey Road, Hatfield, PA 19440
Phone Number: (215) 997-9000
2. **Project is Located in what Municipality:** Upper Merion Township
3. **Has The Municipality Been Contacted:** X Yes No
4. **Tax Parcel #:** Unknown
5. **Name of Development:** 3000 Horizon Drive
6. **Provide Written Directions for Locating Project Site:** Take Route 202 north from the King of Prussia area to Henderson Road. Make a right onto Henderson Road and proceed to Church Street. Make a left onto Church Street and follow to Horizon Drive. Make a right onto Horizon Drive and follow to 3000 Horizon Drive, which is just before Renaissance Boulevard, on the left.

I. GENERAL INFORMATION ON PROJECT

A. Briefly describe project and extent of earthmoving:

Liberty Property Limited Partnership and Liberty Property Trust (collectively "Liberty or LPT") own the property located at 3000 Horizon Drive in the Renaissance Park in Upper Merion Township, Montgomery County, PA (the "Property"). The Property is occupied by one building and associated asphalt covered parking lots.

The proposed work area, identified as the Waste Ammonia Liquor (WAL) pipeline, runs east to west just north of the southern Property boundary. The pipeline curves to the south in a westerly direction and ultimately leaves the Property about 640 feet from the eastern Property boundary, where it appears to travel onto/under the Williamsburg Commons property. The pipeline stops abruptly about 125 feet from the eastern property line.

The proposed remedy for the portion of the former WAL pipeline present on the Property is to excavate and remove the pipeline and any associated impacted

soils. The pipeline runs parallel and crosses a storm water drainage swale that flows west to east and empties into a regional storm water detention pond located just to the east of the Property.

Prior to any site activities, a barrier of silt fence will be installed at the eastern end of the pipeline. Additionally a berm of hay bales shall be placed immediately behind the silt fence within the active swale. The swale and surrounding banks are covered with weeds and small trees, which will have to be cleared prior to initiation of the pipeline removal work. The minimum amount of clearing that can be completed to allow the removal of the pipeline will be implemented. However, at a minimum, a 10-foot wide swath will be cleared along the entire length of the pipeline. The clearing will be completed with an excavator or similar piece of equipment that is equipped with a hydroaxe. All materials generated during the clearing will be mulched and then used on-site or shipped off-site.

The removal of the pipeline will start at the western end of the line where it goes onto/under the Williamsburg Commons property. The excavator will be positioned so that it is over the center of the pipeline and the work will proceed to the east. Initially, the soil overlying the pipeline will be excavated and placed on plastic on the ground adjacent to the excavation. This soil will be used for site restoration purposes. After removing a sufficient volume of soil, the pipeline will be removed in approximately 10 to 20-foot sections. It is important to note that since this swale provides drainage into the detention basin. Therefore, the pipeline will be removed in 10 to 20 foot sections so that immediate restoration can be performed so as to not impact potential storm water flow.

Because of the potential for a precipitation event, areas disturbed during the removal of the pipeline will be restored as the pipeline is removed. Prior to the placement of the excavated soil, a barrier layer of plastic will be placed between the top of the excavation and the bottom of the clean fill. First, the soil excavated to remove the pipe will be placed back in the excavation and then compacted. The remainder of the excavation will be backfilled with a mixture of rip-rap and 2A-modified stone. Also, if impacted soils are removed these areas will be backfilled with a mixture of rip-rap and 2A-modified stone. If during the pipeline removal activities it is necessary to remove any of the large boulders present in the swale or along the banks of the swale, they will be replaced. Additionally, the areas that are disturbed by the equipment used to remove the pipeline will be restored to as near original conditions as possible. The area cleared will then be reseeded and mulched or covered with hay as may be required. Any trees that may have to be removed and that are required to stabilize the bank areas will be replaced in kind.

The Property is completely developed and is occupied by a building and associated asphalt parking lots. There is an asphalt driveway from Horizon Drive that is used to access the Property. As discussed previously, the pipeline is

located along the southern boundary of the Property and runs alongside a drainage swale. The swale is generally dry except during precipitation events. To allow access to the swale and the pipeline, Penn E&R will install a construction entrance at the approximate location shown on Figure A. The construction entrance will extend from the curb of the parking lot and down the bank to the swale area. The area will be covered with geotextile fabric followed by at least 8-inches of No. 4 stone. The construction entrance will be out 15 feet wide by 20 to 25 feet long. The construction entrance will be maintained throughout the duration of the excavation and backfilling activities. Also, a small ramp leading from the driveway and up over the curb to the construction entrance will be installed using No. 4 stone as well.

The only heavy equipment that will need to access the swale area is a track excavator and a track loader. This equipment will use the construction entrance to access and exit the swale area. If and when this equipment is removed from the swale area it will first be cleaned on a decontamination pad to be constructed at the Property at the approximate location shown on Figure A. The pad will be constructed by first placing hay bales in a square area of 20 feet by 20 feet. The bales will be securely staked so as to prevent shifting. A 40-mil plastic layer (4 layers of 10 mil poly plastic) will then be placed on the ground and draped over the hay bales. Since the tracks should not be in contact with the excavated soils, only the buckets of the equipment will hover over the decon area and be pressure washed into the plastic sheeting. The decon area will be sloped so that decontamination water accumulates in one corner of the pad, which will then be pumped into a 55-gallon drum. The containerized decontamination water will be characterized and, after notifying USEPA, properly disposed of off-site.

B. Estimated Start and Completion Dates:

START: July/August 2005

END: August 2005

C. Name of Nearest Receiving Stream: Matsunk Creek

D. Have Wetlands Been Delineated: X Yes No

E. Soil Information:

(1) Soil Type: Urban/Man Made

(2) Is the Soil Hydric: Yes X No

- A wetlands survey was completed and no wetlands were identified in the swale area

(3) Limitations: N/A

II. STORMWATER RUNOFF AND DRAINAGE

- A. Are steep slopes in excess of 10% of the project or the immediate surrounding areas? ☐ Yes ☒ No
- B. Off-site runoff onto the project site must be controlled. Does off-site drainage exist? ☒ Yes ☐ No

As previously indicated, the area being excavated is located in the stormwater collection swale that flows into the regional detention pond. Although the swale is not constantly flowing, the potential of a significant flow does exist in the event of a precipitation occurrence. Since this potential does exist, the approach for excavation within the swale will be to excavate and backfill only that length of pipeline which can be successfully completed (excavated and backfilled) by the end of the work day.

- C. Will the project increase run-off velocities or channelize stormwater run-off? ☐ Yes ☒ No

III. SEQUENCE OF ACTIVITIES

1. Install construction entrance.
2. Install the decontamination pad.
3. Install erosion, sediment and storm water controls as discussed in this Plan and as shown on Figure A.
4. Perform the minimal clearing and grubbing necessary to work within the swale area.
5. Mobilize dozer and excavator to the work area and commence excavation and backfill activities.
6. The silt fencing and/or straw bale barriers will be inspected daily and any accumulation of silt removed per the attached requirements.
7. Upon completion of the excavation activities, decontaminate equipment buckets.
8. Restoration of swale by seeding and mulching. All erosion and sedimentation control devices will then be removed.

IV. TEMPORARY EROSION AND SEDIMENTATION CONTROLS**A. Check if Applicable**

- | | |
|--|--|
| <input checked="" type="checkbox"/> Straw Bale Barrier | <input type="checkbox"/> Sediment Trap |
| <input checked="" type="checkbox"/> Filter Fabric | <input checked="" type="checkbox"/> Rock Const. Entrance |
| <input type="checkbox"/> Temporary Swale | <input checked="" type="checkbox"/> Mulching/Seeding |
| <input type="checkbox"/> Rock Filters | <input type="checkbox"/> Other |

B. Check if Applicable

- ☒ All items checked above will be to the specifications of the document entitled "Erosion and Sedimentation Control Plan Guide for Small Projects", developed by the Southeast Pennsylvania Association of Conservation Districts (SPACD). The appropriate specifications for each control are provided in Attachment A.
- ☐ Alternative controls and/or specifications are proposed.

V. PERMANENT CONTROLS**A. Check if Applicable**

- ☒ Permanent vegetation will be established per SPACD recommendations.
- ☐ Alternative specifications have been developed for re-vegetation.
- ☐ Other permanent controls have been developed for this project, as described below.

B. Describe Other Controls:

None required.

VI. MAINTENANCE PROGRAM

A. Required Measures:

1. Until the site is stabilized, all erosion and sedimentation controls will be maintained properly. Maintenance will include inspections of all erosion and sedimentation controls after each storm event or on a daily basis. All preventative and remedial maintenance work, including clean out, repair, replacement, mulching and renetting will be performed immediately.
2. Should any measures contained within this plan prove incapable of adequately removing sediment from on-site flows prior to discharge or of stabilizing the surfaces involved, additional measures will be immediately implemented to eliminate all such problems.
3. After final site stabilization has been achieved, temporary erosion and sedimentation controls will be removed. Areas disturbed during removal of the controls will be stabilized through mulching and seeding.

B. Check if Applicable:

- ☒ Sediment must be removed where accumulations reach $\frac{1}{2}$ the above ground height of silt fencing.
- ☒ Sediment must be removed where accumulations reach $\frac{1}{3}$ the above ground height of straw bale barriers.
- ☐ Stormwater inlets must be protected until the tributary areas are stabilized and control measures maintained after each storm event.
- ☐ Sediment must be removed from traps when storage capacities are reduced to 1,300 cubic feet per tributary acre.
- ☐ Sediment traps must be protected from unauthorized acts of third parties.

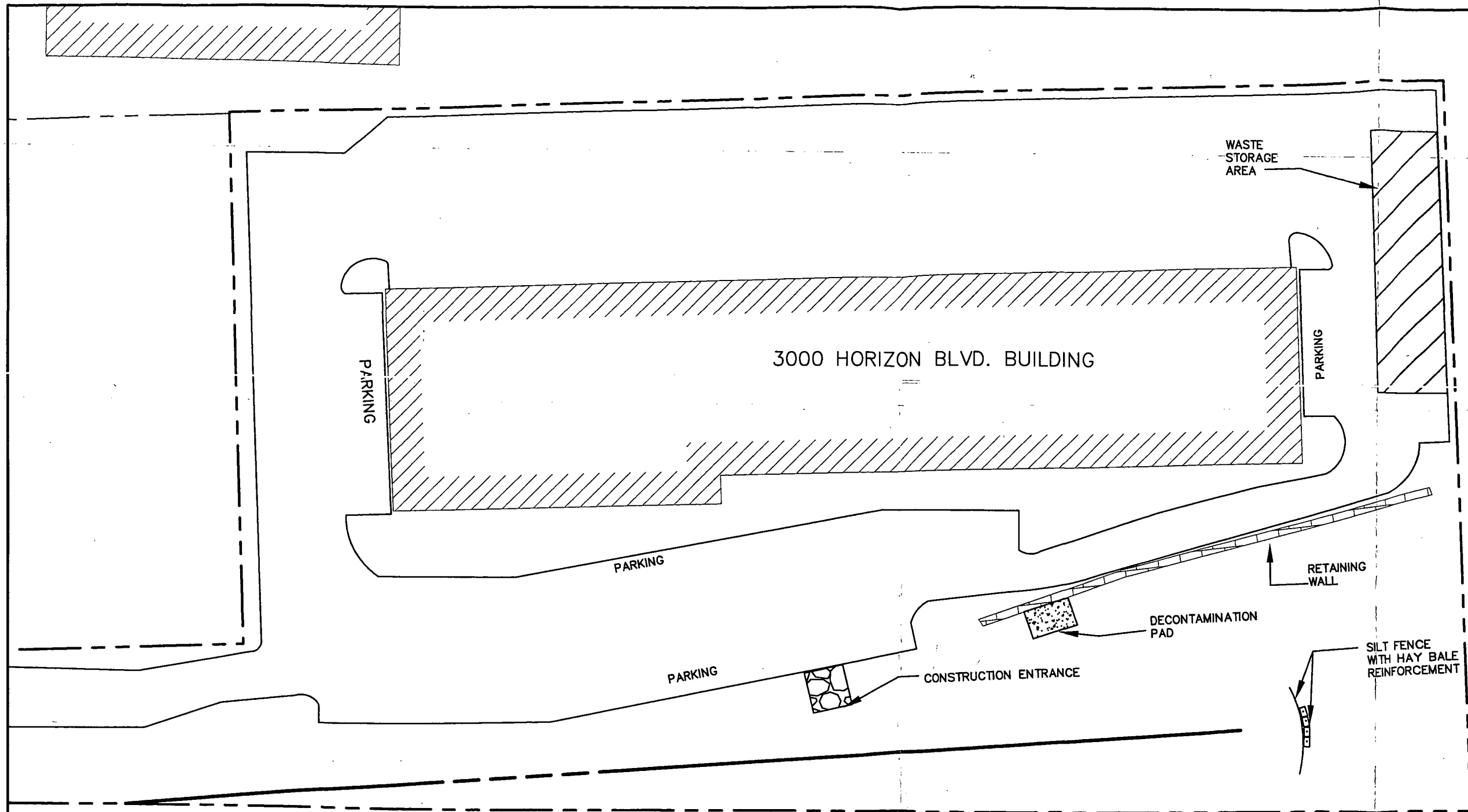
VII. EROSION CONTROL PLAN

Attached Figure A shows the location of the WAL pipeline and all erosion, sedimentation and storm water control devices that will be implemented as part of this project.

ORIGINAL

**ATTACHMENT A
EROSION AND SEDIMENTATION
CONTROL DEVICE SPECIFICATIONS**

ORIGINAL



PROPERTY

- LEGEND:
- PROPERTY BOUNDARY
 - SUSPECTED BURIED PIPE
 - POSSIBLE SECTION OF MISSING PIPE



Penn E&R
Environmental & Remediation, Inc.
COST EFFECTIVE ENVIRONMENTAL SOLUTIONS
2755 BERGEY ROAD, HATFIELD, PA 19440
(215) 997-9000
359 NORTH GATE DRIVE, SUITE 400, WARRENDALE, PA 15086
(724) 934-3530

DWG NO. HA 4013-004
DRW BY MD
DATE 16-JUN-05
SCALE NTS

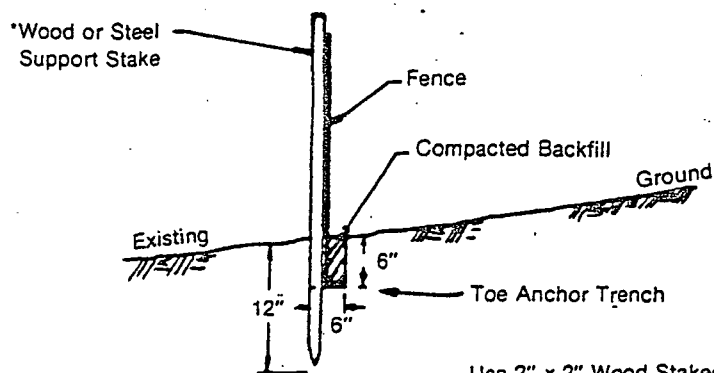
FIGURE A

SOIL AND ERROSION CONTROL PLAN

3000 HORIZON BOULEVARD PROPERTY
UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

XX	0	XX	2X
SCALE IN FEET			

Filter Fabrics Fence Installation Details

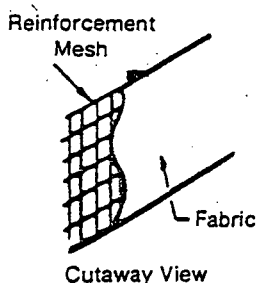
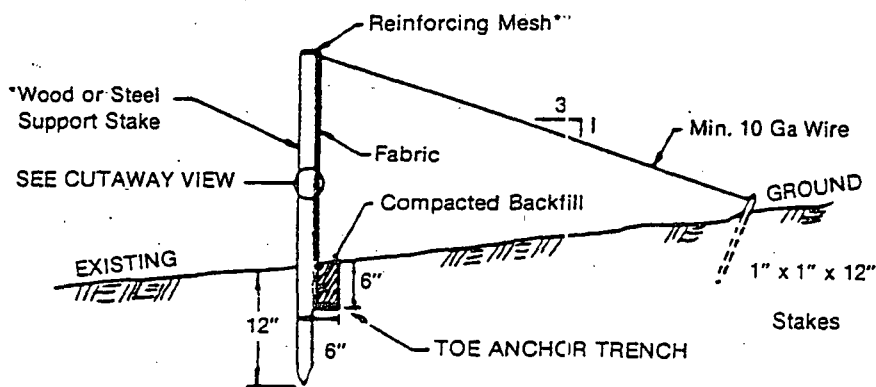


STANDARD SECTION
18" FENCE HEIGHT

Use 2" x 2" Wood Stakes (Min)
or Steel Stake of equal strength

*SPACING OF SUPPORT STAKES @ 8' MAX.

REINFORCED SECTION
30" FENCE HEIGHT



**MESH: Either Industrial Polypropylene
or Steel mesh w/Max 6"
Opening = 1" - Min. 14 Ga.

* SPACING OF SUPPORT STAKES
@ 8" MAX.

TABLE 5.2 Maximum Slope Lengths for Filter Fabric Fences

Slope - Percent	Maximum Slope Length (ft) Above Fences	
	18" High Fence	30" High Fence
2 (or less)	250	500
5	100	250
10	50	150
15	35	100
20	25	70
25	20	55
30	15	45
35	15	40
40	15	35
45	10	30
50	10	25

Slope - Percent: A 2% slope would equal a two foot vertical drop in 100 feet of horizontal distance.

(Slope Length is calculated based on drainage area; multiple rows of silt fence is not acceptable.)

FILTER FABRIC FENCE (SILT FENCE)

INSTALLATION:

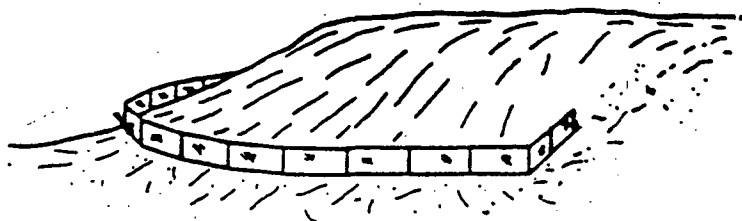
- (1) A trench will be plowed or otherwise excavated to the required depth with little, if any, disturbance to the downslope side of the trench. The bottom of the trench and the fence top will be placed at level grade.
- (2) Support stakes will be driven to the 12" minimum depth below the existing ground surface, at 8' maximum intervals.
- (3) Stretch and fasten fabric to the upslope side of the support stakes (if a reinforced section, fasten reinforcement mesh prior to fastening the fabric).
- (4) Where ends of fabric come together, they will be overlapped, folded and stapled to prevent sediment bypass.
- (5) The toe anchor will be backfilled and compacted to a density equal to surrounding soils.
- (6) If constructing a reinforced section, attach guy wires to support stakes. Provisions should be made for easy loosening and removal of guy wires to allow for access to perform maintenance work.

MAINTENANCE:

- (1) The fence installation should be inspected after every precipitation event and weekly. Any necessary repairs will be made immediately.
- (2) Accumulated sediments will be removed as required to keep the fence functional. In all cases remove deposits where accumulations reach 1/2 the above ground height of the fence.
- (3) All undercutting or erosion of the toe anchor will be repaired immediately with compacted backfill materials.

RESTRICTIONS:

- (1) The formation of concentrated flows on the drainage slope above a filter fabric fence installation is not permitted. If concentrated flows do occur, direct slope stabilization measures must be employed to prevent such conditions.
- (2) Filter fabric fences will not be placed in any area of concentrated flows such as ditches, swales, channels, etc.
- (3) Filter fabric fences will not be used in areas where rock or rocky soils prevent the full and uniform anchoring of the fence toe.
- (4) Filter fabric material will not be placed across the entrance to pipes or culverts and will not be wrapped around the principal spillway structures of sediment traps or basins.



ILLUSTRATION

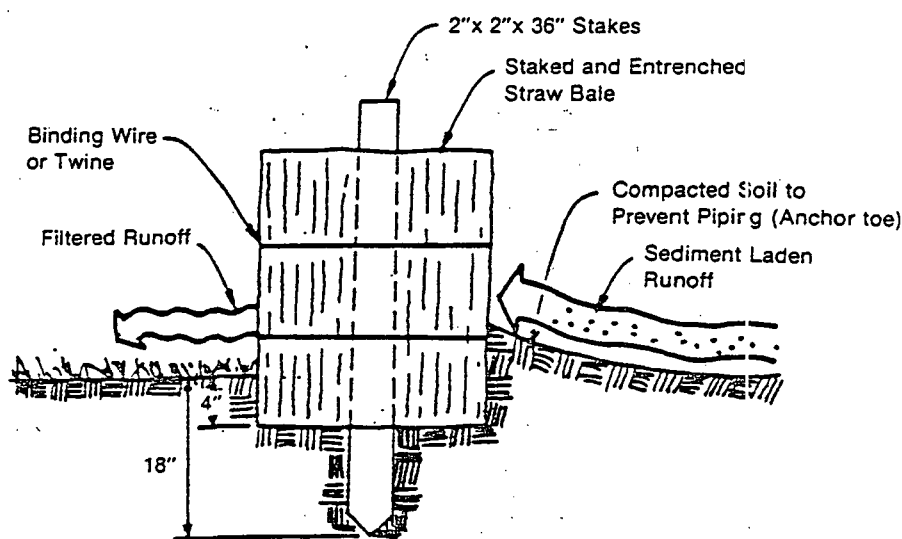
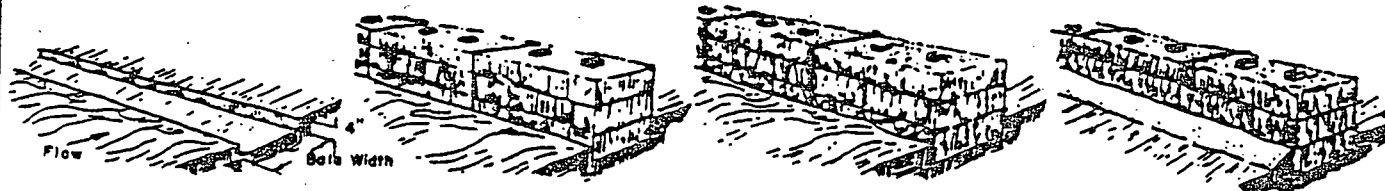
Straw Bale Barrier

1. Excavate the Trench.

2. Place and Stake Straw Bales.

3. Wedge Loose Straw Between Bales.

4. Backfill and Compact the Excavated Soil. (Anchor Toe)



INSTALLATION:

- (1) The anchoring trench will be constructed to the required grade and depth shown.
- (2) Support stakes will be driven to the 18" minimum depth.
- (3) The anchoring trench will be backfilled and compacted to a density equal to undisturbed site soils.

MAINTENANCE:

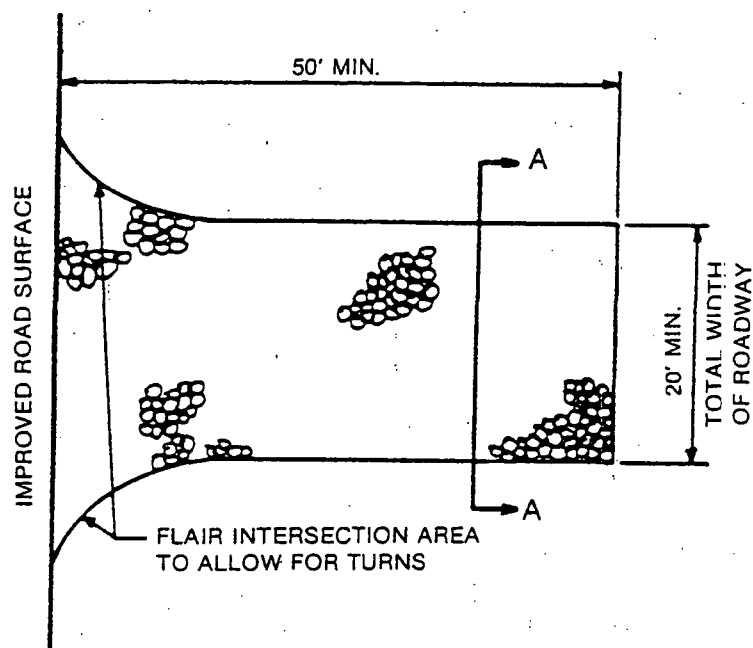
- (1) The barrier will be inspected after every runoff event. Dislodged bales should be reset, staked and backfilled to the requirements listed under "Installation". All clogged or inoperative bales will be replaced.
- (2) Accumulated sediments will be removed as required and in all cases where uniform accumulations reach 1/3 the above ground height of the barrier.
- (3) All undercutting or erosion of the anchor toe will be repaired immediately with compacted backfill materials.

RESTRICTIONS:

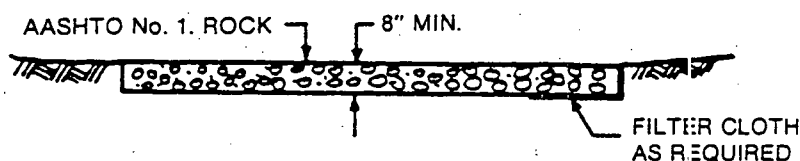
- (1) Restrictions are the same as fabric fence.
- (2) Slope length limitations are the same as fabric fence.
- (3) Straw bale barriers will be replaced every three months or more often if the bales deteriorate.

Rock Construction Entrance Details

PLAN VIEW



TYPICAL SECTION A-A



DESIGN:

- (1) Rock construction entrances will be constructed to the minimum width, length and thickness dimensions shown.
- (2) Rock will be AASHTO Number 1 as specified in Section 703.2 of the PennDOT Publication 408.
- (3) For installation on clayey or poorly drained soils, a geotextile fabric underlayment, of a type recommended for such applications by the manufacturer, will be used.

CONSTRUCTION:

- (1) Construction will be to the dimensions shown on the construction drawings.

MAINTENANCE:

- (1) The structure's thickness will be constantly maintained to the specified dimension by adding rock. A stockpile of rock material will be maintained on the site for this purpose. At the end of each construction day, all sediment deposited on public roadways, will be removed and returned to the construction site. Washing of the roadway with water is not permitted.

PROTECTING WORKERS IN HOT ENVIRONMENTS

ORIGINAL

Many workers spend some part of their working day in a hot environment. Workers in foundries, laundries, construction projects, and bakeries -- to name a few industries -- often face hot conditions which pose special hazards to safety and health.

HEAT STRESS CAUSES BODY REACTIONS

Four environmental factors affect the amount of stress a worker faces in a hot work area: temperature, humidity, radiant heat (such as from the sun or a furnace) and air velocity. Perhaps most important to the level of stress an individual faces are personal characteristics such as age, weight, fitness, medical condition and acclimatization to the heat.

The body reacts to high external temperature by circulating blood to the skin which increases skin temperature and allows the body to give off its excess heat through the skin. However, if the muscles are being used for physical labor, less blood is available to flow to the skin and release the heat.

Sweating is another means the body uses to maintain a stable internal body temperature in the face of heat. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salts lost are adequately replaced.

Of course there are many steps a person might choose to take to reduce the risk of heat stress, such as moving to a cooler place, reducing the work pace or load, or removing or loosening some clothing.

But the body cannot dispose of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the individual begins to lose concentration and has difficulty focusing on a task, may become irritable or sick and often loses the desire to drink. The next stage is most often fainting and death is possible if the person is not removed from the heat stress.

HEAT DISORDERS

Heat stroke, the most serious health problem for workers in hot environments, is caused by the failure of the body's internal mechanism to regulate its core temperature.

Sweating stops and the body can no longer rid itself of excess heat. Signs include (1) mental confusion, delirium, loss of consciousness, convulsions or coma; (2) a body temperature of 106 degrees F or higher; and (3) hot dry skin which may be red, mottled,

or bluish. Victims of heat stroke will die unless treated promptly. While awaiting medical help, the victim must be removed to a cool area and his or her clothing soaked with cool water. He or she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.

Heat exhaustion results from loss of fluid through sweating when a worker has failed to drink enough fluids or take in enough salt or both. The worker with heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly higher. Treatment is usually simple: the victim should rest in a cool place and drink an electrolyte solution (a beverage used by athletes to quickly restore potassium, calcium, and magnesium salts). Severe cases involving victims who vomit or lose consciousness may require longer treatment under medical supervision.

Heat cramps, painful spasms of the muscles, are caused when workers drink large quantities of water but fail to replace their bodies' salt loss. Tired muscles -- those used for performing the work -- are usually the ones most susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking liquids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

Fainting (heat syncope) may be a problem for the worker unacclimatized to a hot environment who simply stands still in the heat. Victims usually recover quickly after a brief period of lying down. Moving around, rather than standing still, will usually reduce the possibility of fainting.

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impedes a worker's performance or even results in temporary total disability. It can be prevented by resting in a cool place and allowing the skin to dry.

PREVENTING HEAT STRESS

Most heat-related health problems can be prevented or the risk of developing them reduced. Following a few basic precautions should lessen heat stress.

1. A variety of engineering controls including general ventilation and spot cooling by local exhaust ventilation at points of high heat production may be helpful. Shielding is required as protection from radiant heat sources. Evaporative cooling and mechanical

refrigeration are other ways to reduce heat. Cooling fans can also reduce heat in hot conditions. Eliminating steam leaks will also help. Equipment modifications, the use of power tools to reduce manual labor and personal cooling devices or protective clothing are other ways to reduce the hazards of heat exposure for workers.

2. Work practices such as providing plenty of drinking water -- as much as a quart per worker per hour -- at the workplace can help reduce the risk of heat disorders. Training first aid workers to recognize and treat heat stress disorders and making the names of trained staff known to all workers is essential. Employers should also consider an individual worker's physical condition when determining his or her fitness for working in hot environments. Older workers, obese workers and personnel on some types of medication are at greater risk.

3. Alternating work and rest periods with longer rest periods in a cool area can help workers avoid heat stress. If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided. Supervisors should be trained to detect early signs of heat stress and should permit workers to interrupt their work if they are extremely uncomfortable.

4. Acclimatization to the heat through short exposures followed by longer periods of work in the hot environment can reduce heat stress. New employees and workers returning from an absence of two weeks or more should have 5-day period of acclimatization. This period should begin with 50 percent of the normal workload and time exposure the first day and gradually building up to 100 percent on the fifth day.

5. Employee education is vital so that workers are aware of the need to replace fluids and salt lost through sweat and can recognize dehydration, exhaustion, fainting, heat cramps, salt deficiency, heat exhaustion, and heat stroke as heat disorders. Workers should also be informed of the importance of daily weighing before and after work to avoid dehydration.

MORE INFORMATION

A 15-page booklet, *Working in Hot Environments*, is available free from National Institute for Occupational Safety and Health Publications, 4676 Columbia Parkway, Cincinnati, Ohio 45226; telephone (513) 533-8287.

ORIGINAL

Attachment 6B(3)

ARSENIC

I PRODUCT IDENTIFICATION

Trade Name: Arsenic
Chemical Family: Metallic element

Formula: As
CAS #: 7440-38-2

II HAZARDOUS INGREDIENTS

Hazardous Components	%	OSHA/PEL	ACGIH/TLV	Sec. <u>313</u>
Arsenic	0-100	10 ug/m ³	0.01 mg/m ³	Yes

III PHYSICAL DATA

Boiling Point: 613 °C (Sublimes)

Melting Point: 81.7 °C

Vapor Density (Air=1): N/A

Vapor Pressure: 1mm @ 372 °C

Solubility in H₂O: Insoluble

% Volatiles: 0

Appearance and Odor: Steel-grey brittle solid, no odor.

Specific gravity
(H₂O=1): 5.72 gm/cc

IV FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

Autoignition Temp: N/A

Flammability: Lower: N/A Upper: N/A

Extinguishing Media: Do not use water. Use carbon dioxide, dry chemical extinguishing agents, dry sand, dry ground dolomite.

Special Firefighting Procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in fire.

Unusual Fire and Explosion Hazard: Slight explosion hazard in the form of a dust when exposed to flame. Moderate fire hazard in the form of dust when exposed to heat or flame or by chemical reaction.

V HEALTH HAZARD INFORMATION

Effects of Exposure:

Acute arsenic poisoning (from ingestion) results in marked irritation of the stomach and intestines with nausea, vomiting and diarrhea. In severe cases the vomitus and stools are bloody and the patient goes into collapse and shock with weak, rapid pulse, cold sweats, coma and death. Chronic arsenic poisoning, whether through ingestion or inhalation, may manifest itself in many different ways. There may be disturbances of the digestive system such as loss of appetite, cramps, nausea, constipation or diarrhea. Liver damage may occur, resulting in jaundice. Disturbances of the blood, kidneys and nervous system are not infrequent. Arsenic can cause a variety of skin abnormalities including itching, pigmentation and even cancerous changes. A characteristic of arsenic poisoning is the great variety of symptoms that can be produced. A recognized carcinogen of the skin, lungs, liver. An experimental carcinogen of the mouth, esophagus, larynx, bladder and para nasal sinus. (Sax, Dangerous Properties of Industrial Materials)

Acute Effects:

Inhalation: Causes irritation of mucous membranes and respiratory tract, metallic taste, pharyngitis, bloody nose, perforation of the nasal septum.

Ingestion: May cause vomiting, diarrhea and nausea.

Skin: Causes moderate irritation, skin sensitization.

Eye: Causes moderate irritation.

Chronic Effects:

Inhalation: May cause cancer (skin and lung).

Ingestion: May cause cancer (skin and lung).

Skin: Can cause eczematous dermatitis, pigmentation, hyperkeratosis.

Eye: None known

Other Health Hazards: There is evidence that arsenic may cross the placental barrier. Arsenic is a neurotoxin. Poisoning may affect the heart, GI system, kidneys and liver.

Routes of Entry: Inhalation, ingestion.

Medical Conditions Generally Aggravated by Exposure: No data

Carcinogenicity: NTP: Yes IARC: Yes OSHA: Yes

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: No specific information available, one should obtain medical attention.

INGESTION: No data available but one should obtain medical attention.

SKIN: Remove contaminated clothing, flood skin with large amounts of water. If irritation persists seek medical attention.

EYE: Immediately flush eyes, including under eyelids, with large amounts of water for at least 15 minutes. Call a physician.

VI REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Incompatibles, exposure to air.

Incompatibility (Materials to Avoid): Acids, acid fumes, oxidizing agents, halogens, heat, palladium, zinc, platinum, nitrogen trichloride, silver nitrate, acetylenes, chlorosylamine, chromium (VI) oxide, sodium peroxide, dirubidium acetylde.

ORIGINAL

Hazardous Decomposition Products: At temperatures above the melting point, metal oxide fumes may be evolved. Under reducing conditions (i.e. any strong acid or base plus an active metal) or in the presence of nascent hydrogen, highly toxic arsine gas may be evolved.

Hazardous Polymerization: Will not occur.

VII SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Any method which keeps dust to a minimum is acceptable. Vacuuming is preferred for dust. Use approved respiratory protection if possibility of dust/fume exposure exists. Do not use compressed air for cleaning.

Waste Disposal Method: Dispose of in accordance with all State, Federal and Local regulations.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: Where airborne exposures may exceed OSHA/ACGIH permissible air concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, fumes and mists having a TWA less than 0.05 mg/m^3 .

Ventilation: Glove bag or box preferred.

Protective Gloves: Rubber

Eye/Face Protection: ANSI approved safety goggles with a full face shield.

Other Protective Equipment: Full protective clothing, lab coat and apron, flame and chemical resistant coveralls, is recommended for exposures that exceed permissible air concentrations. All contaminated clothing should be removed before leaving plant premises.

IX SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Use of approved respirators is required for applications where adequate ventilation cannot be provided. Activities which generate dust or fume should be avoided. When melted, the temperature should be kept as low as possible. Keep container tightly closed. Store in a cool, dry, well-ventilated area. Wash thoroughly after use.

Work Practices: Avoid inhalation or ingestion. Practice good housekeeping and personal hygiene procedures. No tobacco or food in the work area. Wash thoroughly before eating or smoking. Shower and change clothes at end of work shift. Do not wear contaminated clothing home. Do not blow dust off clothing with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and hygienic facilities for washing.



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZO(a)PYRENE**

CAS Number: 50-32-8

DOT Number: None

RTK Substance number: 0207

Date: August 1992 Revision: July 1998

HAZARD SUMMARY

- * **Benzo(a)pyrene** can affect you when breathed in and by passing through your skin.
- * **Benzo(a)pyrene** is a **CARCINOGEN--HANDLE WITH EXTREME CAUTION.**
- * Exposure may damage the developing fetus.
- * **Benzo(a)pyrene** can cause skin irritation with rash and/or burning sensations. Repeated exposure can cause skin changes such as thickening and darkening.
- * Exposure can irritate and/or burn the eyes on contact.
- * Except in laboratories, **Benzo(a)pyrene** is usually mixed with other "Coal Tar Pitch" chemicals. **CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH and SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEETS ON COAL TAR SUBSTANCES.**

IDENTIFICATION

Benzo(a)pyrene is a pale yellow, crystalline solid or a powder. In its pure form it is used as a laboratory reagent. **Benzo(a)pyrene** also forms as a gaseous by-product when certain carbon substances burn, such as coal tar pitch chemicals.

REASON FOR CITATION

- * **Benzo(a)pyrene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, IARC, NIOSH, NTP, EPA, HHAG and DOT.
- * This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN** and a **MUTAGEN**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) for *Coal Tar Pitch Volatiles* (benzene-soluble fraction) is **0.2 mg/m³** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit for *Coal Tar Pitch Volatiles* (cyclohexane-extractable fraction) is **0.1 mg/m³** averaged over a 10-hour workshift.

ACGIH: ACGIH recommends that worker exposures, by all routes, be controlled to levels as low as can be reasonably achieved.

- * **Benzo(a)pyrene** is a **PROBABLE CARCINOGEN** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * A regulated, marked area should be established where **Benzo(a)pyrene** is handled, used, stored, or formed.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Benzo(a)pyrene** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benzo(a)pyrene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(a)pyrene**:

- * **Benzo(a)pyrene** can cause skin irritation with rash and/or burning sensations. Exposure to sunlight and the chemical together can increase these effects.
- * Exposure can irritate and/or burn the eyes on contact.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(a)pyrene** and can last for months or years:

Cancer Hazard

- * **Benzo(a)pyrene** is a PROBABLE CARCINOGEN in humans. There is some evidence that it causes skin, lung, and bladder cancer in humans and in animals.
- * **Benzo(a)pyrene** has caused CANCER in the offspring of animals exposed to the substance during pregnancy.
- * Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- * **Benzo(a)pyrene** may damage the developing fetus.
- * There is some evidence that **Benzo(a)pyrene** may affect sperm and testes (male reproductive glands).
- * **Benzo(a)pyrene** may be transferred to nursing infants through the exposed mother's milk.

Other Long-Term Effects

- * Repeated exposure to **Benzo(a)pyrene** can cause skin changes such as thickening, darkening, and pimples. Later skin changes include loss of color, reddish areas, thinning of the skin, and warts.

MEDICAL

Medical Testing

If warts or other growths on the skin get larger or change color, they should be examined by a doctor for possible early skin cancer. Skin cancer is very often easily cured when detected early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

- * Sunlight may cause a rash to develop in people exposed to **Benzo(a)pyrene** and increases the risk of skin cancer.
- * Tobacco smoke also contains **Benzo(a)pyrene**. Smoking may increase the risk of lung cancer with exposure to **Benzo(a)pyrene**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- * Where possible, automatically transfer **Benzo(a)pyrene** from drums or other storage containers to process containers.
- * Use a Class I, Type B, biological safety hood when working with **Benzo(a)pyrene** in a laboratory.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Benzo(a)pyrene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benzo(a)pyrene**.

- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Benzo(a)pyrene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benzo(a)pyrene**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where the above chemicals or **Benzo(a)pyrene** are handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
- * In laboratories DO NOT DRY SWEEP for clean-up. Use a vacuum or a wet method to reduce dust during clean-up.
- * When vacuuming, a high efficiency particulate absolute (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Benzo(a)pyrene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear dust-proof goggles and face shield when working with powders or dust, unless full facepiece respiratory protection is worn.
- * Where exposure to volatilized *Coal Tar* products may occur, wear gas-proof goggles and face shield, unless full facepiece respiratory protection is worn.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposures over 0.1 mg/m^3 , use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- * Exposure to 80 mg/m^3 of *Coal Tar Pitch Volatiles* is immediately dangerous to life and health. If the possibility of exposure above 80 mg/m^3 exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.

ORIGINAL

- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.
- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
- Q: But aren't pregnant women at the greatest risk from reproductive hazards?
- A: Not necessarily. Pregnant women are at greatest risk from chemicals which harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/coh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

ORIGINAL

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

[illegible]

Common Name: **BENZO(a)PYRENE**
 DOT Number: **None**
 NAERG Code: **No Citation**
 CAS Number: **50-32-8**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	1	-
REACTIVITY	0	-

CARCINOGEN
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

- * **Benzo(a)pyrene** may burn, but does not readily ignite.
- * Use dry chemical, CO₂, water spray, or foam extinguishers.
- * **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Carbon Monoxide*.
- * If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Benzo(a)pyrene** or other *Coal Tar* Products are spilled, take the following steps:

- * Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
- * Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
- * Ventilate the area after clean-up is complete.
- * It may be necessary to contain and dispose of **Benzo(a)pyrene** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- * If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE

- * Prior to working with **Benzo(a)pyrene** you should be trained on its proper handling and storage.
- * A regulated, marked area should be established where **Benzo(a)pyrene** is handled, used, stored, or formed.
- * **Benzo(a)pyrene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE)
- * Store in tightly closed containers in a cool, well-ventilated area.

FIRST AID

In NJ, POISON INFORMATION 1-800-764-7661

Eye Contact

- * Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

- * Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Breathing

- * Remove the person from exposure.
- * Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: Greater than 1 mm Hg at 68°F (20°C)

Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:

Benzo(a)pyrene

Other Names:

B(a)P; BP; 3,4-Benzopyrene

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES

Right to Know Program

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

ORIGINAL



Chemical Fact Sheet

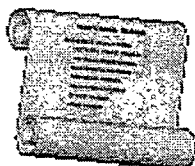
Chemical Abstract Number (CAS #)	53703
Synonyms	Dibenzo(a,h)anthracene
	Dibenz(a,h)anthracene
	1,2:5,6-Dibenzanthracene
Analytical Methods	<u>EPA Method 525</u>
	<u>EPA Method 610</u>
	<u>EPA Method 625</u>
	<u>EPA Method 8100</u>
	<u>EPA Method 8250A</u>
	<u>EPA Method 8310</u>
Molecular Formula	C ₂₂ H ₁₄
Use	RESEARCH CHEMICAL No known use of this compound
Apparent Color	COLORLESS PLATES OR LEAFLETS RECRYSTALLIZED FROM ACETIC ACID; SOLN IN CONCENTRATED SULFURIC ACID IS RED; CRYSTALS MAY BE MONOCLINIC OR ORTHORHOMBIC
Melting Point	266 DEG C
Molecular Weight	278.33
Density	1.282
Environmental Impact	<p>Dibenz(a,h)anthracene's (DBahA) release to the environment is quite general since it is a ubiquitous product of incomplete combustion. It is largely associated with particulate matter, soils, and sediments. Its presence in places distant from primary sources indicates that it is reasonably stable in the atmosphere and capable of long distance transport. If it is released to soils it will be expected to adsorb very strongly to the soils and will not be expected to leach to the groundwater, hydrolyze or evaporate from soils or surfaces. It will be subject to biodegradation in soils with reported half-lives of 18 and 21 days. If DBahA is released to water it will be expected to adsorb very strongly to sediments and particulate matter and to bioconcentrate in aquatic organisms which lack microsomal oxidase (this enzyme enables the rapid metabolism of certain polycyclic aromatic hydrocarbons). Based on limited data from laboratory screening tests using settled domestic wastewater and activated sludge, DBahA may be subject to biodegradation in natural waters. Since DBahA absorbs solar radiation strongly, it may be subject to direct photolysis in natural waters. However, adsorption may significantly retard photolysis as the photosensitivity of polyaromatic hydrocarbons is strongly dependent upon the nature of the surface upon which the compound is adsorbed. It will not hydrolyze and should not evaporate from water. If released to the atmosphere it will likely be associated with particulate matter and may be subject to moderately long range transport, depending mainly on the particle size</p>

ORIGINAL

	<p>distribution and climatic conditions which will determine the rates of wet and dry deposition. Its presence in areas remote from primary sources demonstrates the potential for this long range transport as well as DBahA's considerable stability in the air. It may be subject to direct photolysis in the atmosphere; however, adsorption may significantly retard photolysis as the photosensitivity of polyaromatic hydrocarbons is strongly dependent upon the nature of the surface upon which the compound is adsorbed. The estimated vapor phase half-life in the atmosphere is 1.00 day as a result of reaction with photochemically produced hydroxyl radicals. Human exposure will be from inhalation of contaminated air and consumption of contaminated food and water.</p>
Environmental Fate	<p>TERRESTRIAL FATE: If dibenz(a,h)anthracene is released to the soil, it will adsorb very strongly to the soil and will not be expected to leach to the groundwater. It will not hydrolyze or evaporate from soils or surfaces. It will be subject to biodegradation in soil systems with reported half-lives of 18 and 21 days . AQUATIC FATE: If dibenz(A,H)anthracene (DBahA) is released to water, it will be expected to adsorb very strongly to sediments and particulate matter. It will not hydrolyze and volatilization will not be an important process. It will be expected to bioconcentrate in aquatic organisms which lack microsomal oxidase (this enzyme enables the rapid metabolism of certain polycyclic aromatic hydrocarbons). No information was found on the biodegradation of DBahA in natural waters; however, based on limited data from laboratory screening tests using settled domestic wastewater and activated sludge, it may be subject to biodegradation in natural waters. Since DBahA's absorbs solar radiation strongly, it may be subject to direct photolysis in natural waters; however, the photosensitivity of polyaromatic hydrocarbons is strongly dependent upon the nature of the surface upon which the compound is adsorbed. ATMOSPHERIC FATE: Dibenz(a,h)anthracene (DBahA) released to the atmosphere will likely be associated with particulate matter and may be subject to moderately long range transport, depending mainly on the particle size distribution and climatic conditions which will determine the rates of wet and dry deposition. Its presence in areas remote from primary sources demonstrates the potential for this long range transport as well as DBahA's considerable stability in the air. The estimated vapor phase half-life in the atmosphere is 1.00 day as a result of reaction with photochemically produced hydroxyl radicals.</p>
Drinking Water Impact	<p>DRINKING WATER: Identified, not quantified, in finished drinking water . EFFL: USA Nationwide Urban Runoff Program, not detected in 86 samples from 15 cities . Coal coking wastewaters, plant A (plant B) final effluent from biological oxidation process discharged to river, 0.062-0.23 ppb (0.017- 0.08 ppb), suspended solid, 2.0-2.9 ppb (0.06-0.5 ppb) . Gasoline engine exhaust, 96 ug/g, coke oven, 84-124 ug/g sample . Combined o-Phenylene pyrene and dibenz(a,c and/or a,h)anthracene: effluent channel from a coking plant, water, 0.95 ppb, sediment, 8.6 ppm dry wt .</p>

DISCLAIMER - Please Read

Return to :

Alphabetical List of CompoundsList of Compounds by CAS NumberList of ServicesSpectrum Laboratories Homepage



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZ(a)ANTHRACENE**

CAS Number: 56-55-3

DOT Number: None

RTK Substance number: 0193

Date: September 1998

HAZARD SUMMARY

- * **Benz(a)Anthracene** can affect you when breathed in.
- * **Benz(a)Anthracene** should be handled as a **CARCINOGEN--WITH EXTREME CAUTION.**
- * *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON COAL TAR.*

IDENTIFICATION

Benz(a)Anthracene is a colorless plate-like material which is recrystallized from glacial *Acetic Acid* or a light yellow to tan powder. It is not produced commercially but occurs as an intermediate during chemical manufacturing. It is also found in *Coal Tar*.

REASON FOR CITATION

- * **Benz(a)Anthracene** is on the Hazardous Substance List because it is cited by ACGIH, NTP, IARC, HHAG and EPA.
- * This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN** and **MUTAGEN**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Benz(a)Anthracene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

- * **Benz(a)Anthracene** may be a **CARCINOGEN** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

- * Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * A regulated, marked area should be established where **Benz(a)Anthracene** is handled, used, or stored.
- * Wear protective work clothing.
- * When using small quantities of **Benz(a)Anthracene** use in a glove box.
- * Wash thoroughly immediately after exposure to **Benz(a)Anthracene** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benz(a)Anthracene** to potentially exposed workers.

ORIGINAL

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benz(a)Anthracene**:

- * No acute (short-term) health effects are known at this time.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benz(a)Anthracene** and can last for months or years:

Cancer Hazard

- * **Benz(a)Anthracene** may be a CARCINOGEN in humans since it has been shown to cause bladder and skin cancer in animals.
- * Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Benz(a)Anthracene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * No chronic (long-term) health effects are known at this time.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * A Class I, Type B, biological safety hood should be used when mixing, handling, or preparing **Benz(a)Anthracene**.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Benz(a)Anthracene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benz(a)Anthracene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Benz(a)Anthracene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benz(a)Anthracene**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Benz(a)Anthracene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Benz(a)Anthracene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Eye protection is included in the recommended respiratory protection.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Engineering controls must be effective to ensure that exposure to **Benz(a)Anthracene** does not occur.
- * At any exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

ORIGINAL

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ANTHRACENE**CAS Number: 120-12-7
DOT Number: UN 1137RTK Substance number: 0139
Date: July 1996 Revision: June 2002

HAZARD SUMMARY

- * Anthracene can affect you when breathed in.
- * Skin contact can cause irritation, itching and burning which is greatly aggravated by sunlight. Repeated contact can cause thickening of the skin and pigment changes.
- * Breathing Anthracene can irritate the nose, throat and lungs causing coughing and wheezing.
- * Eye contact can cause irritation and burns.
- * Anthracene may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.

IDENTIFICATION

Anthracene is a colorless to pale yellow, sand-like material with a bluish fluorescence. It is used in dyestuffs, insecticides and wood preservatives.

REASON FOR CITATION

- * Anthracene is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, HHAG, NFPA and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Coal Tar Pitch volatiles*:

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.1 mg/m³** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.2 mg/m³** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to Anthracene and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Anthracene to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Anthracene**:

- * Skin contact can cause irritation, itching and burning which is greatly aggravated by sunlight.
- * Breathing **Anthracene** can irritate the nose, throat and lungs causing coughing and wheezing.
- * Eye contact can cause irritation and burns.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Anthracene** and can last for months or years:

Cancer Hazard

- * There is no evidence that **Anthracene** causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Anthracene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Anthracene** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * Repeated contact can cause thickening of the skin, patchy areas of increased yellow-brown pigment changes, and loss of skin pigment.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following is recommended:

- * Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Conditions Made Worse By Exposure

- * Avoid direct sunlight exposure to contaminated skin before careful washing of the skin, or to eyes during or shortly after exposure.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer **Anthracene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Anthracene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Anthracene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Anthracene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Anthracene**, whether or not known skin contact has occurred.

- * Do not eat, smoke, or drink where **Anthracene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.
- * Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Anthracene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- * Wear eye protection with side shields or goggles.
- * Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposure over 0.1 mg/m^3 (as *Coal Tar Pitch volatiles*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

- * Exposure to 80 mg/m^3 (as *Coal Tar Pitch volatiles*) is immediately dangerous to life and health. If the possibility of exposure above 80 mg/m^3 (as *Coal Tar Pitch volatiles*) exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Anthracene** you should be trained on its proper handling and storage.
- * **Anthracene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); CHROMIC ACID; and CALCIUM HYPOCHLORITE.
- * Store in tightly closed containers in a cool, well-ventilated area.
- * Sources of ignition, such as smoking and open flames, are prohibited where **Anthracene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

ANTHRACENE

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ORIGINAL

- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

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The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

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A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

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DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<

Common Name: **ANTHRACENE**
DOT Number: **UN 1137**
NAERG Code: **128**
CAS Number: **120-12-7**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	1
REACTIVITY	-	Not Rated
COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

- * **Anthracene is a COMBUSTIBLE SOLID.**
- * Use dry chemical, CO₂, water spray, alcohol or polymer foam extinguishers.
- * **POISONOUS GASES ARE PRODUCED IN FIRE.**
- * **CONTAINERS MAY EXPLODE IN FIRE.**
- * Use water spray to keep fire-exposed containers cool.
- * If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Anthracene is spilled, take the following steps:

- * Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
- * Remove all ignition sources.
- * Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
- * Ventilate and wash area after clean-up is complete.
- * It may be necessary to contain and dispose of **Anthracene** as a **HAZARDOUS WASTE**. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- * If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

- * Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

- * Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

- * Remove the person from exposure.
- * Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- * Transfer promptly to a medical facility.

Antidotes and Special Procedures

- * Sun screening lotions or creams which have the strong ability to screen ultraviolet light can help prevent skin allergic reactions. (These may need frequent reapplications if you are sweating). Ultraviolet-screening sunglasses can help with eye allergic reactions. Consult your doctor or pharmacist in selecting these.

PHYSICAL DATA

Vapor Pressure: 1 mm Hg at 293°F (145°C)

Flash Point: 250°F (121°C)

Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:

Anthracene

Other Names:

Anthracin; Green Oil; Paranaphthalene

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES

Right to Know Program

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ANTHRACENE**CAS Number: 120-12-7
DOT Number: UN 1137RTK Substance number: 0135
Date: July 1996 Revision: June 2002

HAZARD SUMMARY

- * Anthracene can affect you when breathed in.
- * Skin contact can cause irritation, itching and burning which is greatly aggravated by sunlight. Repeated contact can cause thickening of the skin and pigment changes.
- * Breathing Anthracene can irritate the nose, throat and lungs causing coughing and wheezing.
- * Eye contact can cause irritation and burns.
- * Anthracene may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.

IDENTIFICATION

Anthracene is a colorless to pale yellow, sand-like material with a bluish fluorescence. It is used in dyestuffs, insecticides and wood preservatives.

REASON FOR CITATION

- * Anthracene is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, HHAG, NFPA and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Coal Tar Pitch volatiles*:

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.1 mg/m³** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.2 mg/m³** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to Anthracene and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Anthracene to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Anthracene**:

- * Skin contact can cause irritation, itching and burning which is greatly aggravated by sunlight.
- * Breathing **Anthracene** can irritate the nose, throat and lungs causing coughing and wheezing.
- * Eye contact can cause irritation and burns.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Anthracene** and can last for months or years:

Cancer Hazard

- * There is no evidence that **Anthracene** causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Anthracene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Anthracene** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * Repeated contact can cause thickening of the skin, patchy areas of increased yellow-brown pigment changes, and loss of skin pigment.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following is recommended:

- * Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Conditions Made Worse By Exposure

- * Avoid direct sunlight exposure to contaminated skin before careful washing of the skin, or to eyes during or shortly after exposure.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer **Anthracene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Anthracene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Anthracene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Anthracene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Anthracene**, whether or not known skin contact has occurred.

ORIGINAL

- * Do not eat, smoke, or drink where **Anthracene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.
- * Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Anthracene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- * Wear eye protection with side shields or goggles.
- * Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposure over 0.1 mg/m^3 (as *Coal Tar Pitch volatiles*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

- * Exposure to 80 mg/m^3 (as *Coal Tar Pitch volatiles*) is immediately dangerous to life and health. If the possibility of exposure above 80 mg/m^3 (as *Coal Tar Pitch volatiles*) exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Anthracene** you should be trained on its proper handling and storage.
- * **Anthracene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); CHROMIC ACID; and CALCIUM HYPOCHLORITE.
- * Store in tightly closed containers in a cool, well-ventilated area.
- * Sources of ignition, such as smoking and open flames, are prohibited where **Anthracene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

ORIGINAL

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Acenaphthylene

CAS Number: 208-96-8

What is acenaphthylene?

Acenaphthylene is one of a group of chemicals called polycyclic aromatic hydrocarbons, PAHs for short. PAHs are often found together in groups of two or more. They can exist in over 100 different combinations but the most common are treated as a group of 15. PAHs are found naturally in the environment but they can also be man-made. PAHs are solid and range in appearance from colorless to white or pale yellow-green. PAHs are created when products like coal, oil, gas, and garbage are burned but the burning process is not complete.

Very little information is available on the individual chemicals within the PAH group. Most of the information available is for the PAH group as a whole. Information specific to acenaphthylene is included in this fact sheet when available.

What is acenaphthylene used for?

Most of the PAHs are used to conduct research. Like most PAHs, acenaphthylene is used to make dyes, plastics and pesticides.

How can acenaphthylene enter and leave your body?

One of the most common ways acenaphthylene can enter your body is through breathing contaminated air. It can get into your lungs when you breathe it. If you work in a hazardous waste site where PAHs are disposed, you are likely to breathe acenaphthylene and other PAHs. If you eat or drink food and water that are contaminated with PAHs, you could be exposed.

Exposure can also occur if your skin comes into contact with contaminated soil or products like heavy oils, coal tar, roofing tar or creosote where PAHs have been found. Creosote is an oily liquid found in coal tar and is used to preserve wood. Once in your body, the PAHs can spread and target fat tissues. Target organs include kidneys, liver and fat. However, in just a matter of days, the PAHs will leave your body through urine and feces.

How can you be exposed to acenaphthylene?

You can be exposed to PAHs in the environment, in your home and in the work place. Because PAHs exist naturally in the environment, and they are man-made, you can be exposed in a number of ways. Fumes from vehicle exhaust, coal, coal tar, asphalt, wildfires, agricultural burning and hazardous waste sites are all sources of exposure.

You could be exposed to PAHs by breathing cigarette and tobacco smoke, eating foods grown in contaminated soil or by eating meat or other food that you grilled. Grilling and charring food actually increases the amount of PAHs in the food.

If you work in a plant that makes coal tar, asphalt and aluminum, or that burns trash, you can be exposed to PAHs. You can also be exposed if you work in a facility that uses petroleum or coal or where wood, corn and oil are burned.

What are the health effects of exposure to acenaphthylene?

A number of PAHs have caused tumors in laboratory animals that were exposed to PAHs

through their food, from breathing contaminated air and when it was applied to their skin. When pregnant mice ate high doses of a PAH (benzo(a)pyrene), they experienced reproductive problems. In addition, the offspring of the pregnant mice showed birth defects and a decrease in their body weight. Other effects include damage to skin, body fluids and the immune system which helps the body fight disease. However, these effects have not been seen in humans.

What levels of exposure have resulted in harmful health effects?

There is no information available from studies on humans to tell what effects can result from being exposed to individual PAHs at certain levels. However, breathing PAHs and skin contact seem to be associated with cancer in humans. Animal studies showed that mice exposed to 308 parts per million (ppm) of PAHs (specifically benzo(a)pyrene) in food for 10 days (short term exposure) had offspring with birth defects. Mice exposed to 923 ppm of benzo(a)pyrene in food for several months caused problems in the liver and blood.

The U.S. Environmental Protection Agency has indicated that not enough information exists to classify acenaphthylene as a cancer causing substance.

Where can you get more information?

Contact your state health or environmental department, or:

Agency for Toxic Substances and Disease
Registry
Division of Toxicology
1600 Clifton Road, N.E., E-29
Atlanta, Georgia 30333

References

1. Agency for Toxic Substances and Disease

- Registry (ATSDR). *Public Health Statement, Polycyclic Aromatic Hydrocarbons*. Atlanta, GA: U.S. Department of Health and Human Services, 1990.
2. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Library of Medicine Bethesda, MD, 2001.



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZO(b)FLUORANTHENE**

CAS Number: 205-99-2

DOT Number: None

RTK Substance number: 0208

Date: September 1995 Revision: July 2001

HAZARD SUMMARY

- * **Benzo(b)fluoranthene** can affect you when breathed in and may be absorbed through the skin.
- * **Benzo(b)fluoranthene** is a CARCINOGEN—HANDLE WITH EXTREME CAUTION.
- * Contact with **Benzo(b)fluoranthene** can cause skin and eye irritation.
- * Because the major hazards associated with **Benzo(b)fluoranthene** come from exposure to *Coal Tar Pitch*, CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON COAL TAR PITCH.

IDENTIFICATION

Benzo(b)fluoranthene is a colorless, needle-shaped solid. It is used as a research chemical and is present in coal, and coke oven emissions, and petroleum products.

REASON FOR CITATION

- * **Benzo(b)fluoranthene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH, NTP, IARC, HHAG and EPA.
- * This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for **Benzo(b)fluoranthene** (measured as *Coal Tar Pitch* volatiles):

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.1 mg/m³** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.2 mg/m³** averaged over an 8-hour workshift.

- * **Benzo(b)fluoranthene** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * A regulated, marked area should be established where **Benzo(b)fluoranthene** is handled, used, or stored.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Benzo(b)fluoranthene** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benzo(b)fluoranthene** to potentially exposed workers.

ORIGINAL

* This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(b)fluoranthene**:

- * Contact with **Benzo(b)fluoranthene** can cause skin and eye irritation.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(b)fluoranthene** and can last for months or years:

Cancer Hazard

- * **Benzo(b)fluoranthene** is a PROBABLE CARCINOGEN in humans. It has been shown to cause lung, liver and skin cancer in animals.
- * Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Benzo(b)fluoranthene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Benzo(b)fluoranthene** has not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Examine your skin periodically for growths or changes in warts or moles. Skin cancers are usually easily curable when removed early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- * Where possible, automatically transfer **Benzo(b)fluoranthene** from drums or other storage containers to process containers.
- * A Class I, Type B, biological safety hood should be used when mixing, handling, or preparing **Benzo(b)fluoranthene**.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Benzo(b)fluoranthene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benzo(b)fluoranthene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Benzo(b)fluoranthene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benzo(b)fluoranthene**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Benzo(b)fluoranthene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**
- * When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Benzo(b)fluoranthene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear impact resistant eye protection with side shields or goggles.
- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposure over **0.1 mg/m³** (as *Coal Tar Pitch volatiles*), use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
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QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
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- Q: What are my chances of getting sick when I have been exposed to chemicals?
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- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
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- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
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- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

ORIGINAL

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

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Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

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NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

H4985



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CHRYSENE**

CAS Number: 218-01-9

DOT Number: None

RTK Substance number: 0441

Date: April 1994

Revision: December 1999

HAZARD SUMMARY

- * Chrysene can affect you when breathed in and by passing through your skin.
- * If skin contaminated with Chrysene is exposed to sunlight, a rash or sunburn effect and permanent changes in skin pigment can occur.
- * Chrysene is almost always found in *Coal Tar Pitch*, *Coal Tar Creosote*, or other coal tar products. If you work with coal, tar, soot, pitch, asphalt, etc., you may be exposed to Chrysene.
- * CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEETS ON COAL TAR PITCH AND COAL TAR CREOSOTE.

IDENTIFICATION

Pure Chrysene is a colorless to off-white flake which is used in laboratories and dye manufacturing. Chrysene is most often found in black or brown tars and pitches.

REASON FOR CITATION

- * Chrysene is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, HHAG and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Coal Tar Pitch* Volatiles:

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.1 mg/m³** averaged over a 10-hour workshift.
- ACGIH: An exposure limit has not been determined for this suspected carcinogen. Worker exposure by all routes should be carefully controlled to the lowest possible level.

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to Chrysene and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Chrysene to potentially exposed workers.

- * This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chrysene**:

- * If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect can occur, sometimes with blisters.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chrysene** and can last for months or years:

Cancer Hazard

- * There is limited evidence that **Chrysene** causes cancer in animals. It may cause skin cancer.
- * Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Chrysene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * Permanent changes in skin pigment can occur if contaminated skin is exposed to sunlight.

MEDICAL

Medical Testing

- * There is no special test for this chemical. However, monthly, carefully look at any skin areas that have been exposed. Any growth (like a mole) that increases in size or shows changes in color should be examined by a physician. Skin cancer is curable when detected early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Sunlight exposure on skin contaminated with *Coal Tar* chemicals can cause rash and later, pigment changes. Persons who smoke cigarettes may be at increased risk for lung cancer with his chemical. This can be significantly reduced by stopping smoking as well as by reducing exposures.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer pure **Chrysene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Chrysene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Chrysene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Chrysene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Chrysene**, whether or not known skin contact has occurred.
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PO Box 368, Trenton, NJ 08625-0368
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ACKNOWLEDGEMENT OF UNDERSTANDING

All personnel who are contracted/sub-contracted to do work on the aforementioned Site are required to review this Health and Safety Plan (HASP) prior to conducting work. By signing below, said personnel acknowledge that they have, themselves, reviewed, or were instructed by the Site Safety Coordinator, the contents and hazards outlined in the HASP.

[illegible]